
Reuven Ramaty Papers

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Descriptive Summary

Creator: Ramaty, R.

Title: Reuven Ramaty Papers,

Date (inclusive): 1963-1999

Extent: 17.80 linear feet(44 archives boxes and 7 oversize folders)

Abstract: Papers of Reuven Ramaty, astrophysicist, pioneer in high energy astrophysics, and a leading theorist at NASA's Goddard Space Flight Center for over 30 years. The collection documents his years at Goddard Space Flight Center first as post-doctoral research associate, then as astrophysicist, and finally as head of the theory office of the Laboratory for High Energy Astrophysics. Ramaty is best known for his study of the high-energy nuclear reactions in solar flares and the use of gamma-ray line and neutron measurements to determine the properties of flare-accelerated particles. Materials in the collection date from 1963-1999. The collection is rich in Ramaty's research and writings and comprises research materials, manuscripts, drafts, and final versions, notes, and correspondence. Writings include most of his significant publications in refereed journals and books. The collection also documents his conference presentations and invited talks. Also included are materials related to Ramaty's involvement in NASA-funded theory initiatives, space science missions, his work on different committees, working groups, and as an organizer of several major space science conferences. The collection is arranged in six series: 1) WRITINGS, 2) CONFERENCES, 3) COMMITTEES, 4) SUBJECT FILES, 5) CORRESPONDENCE, and 6) BIOGRAPHICAL MATERIALS.

Repository: University of California, San Diego. Geisel Library. Mandeville Special Collections Library.

La Jolla, California 92093-0175

Collection number: MSS 0543

Language of Material: Collection materials in English

Access

Letters of recommendation located in box 44, folders 3 and 7 are restricted until 2049.

Acquisition Information

Not Available

Preferred Citation

Reuven Ramaty Papers, MSS 0543. Mandeville Special Collections Library, UCSD.

Publication Rights

Publication rights are held by the creator of the collection.

Biography

Reuven Ramaty was born on February 25, 1937, in Timisoara, a Hungarian enclave in Romania. He grew up during the uproar of World War II in a multicultural environment and immigrated to Israel at age 11. He loved languages and became fluent in Hebrew, English, and French in addition to his native Romanian and Hungarian. He also studied German, Italian and Japanese. Ramaty graduated from Tel Aviv University in 1961 with B.S. in physics. He earned his Ph.D. in planetary space physics from UCLA in 1966 in a record time of two years. Ramaty joined Goddard Space Flight Center in 1967, first as a post-doctoral research associate, and then as a government-employed astrophysicist at the Laboratory for High Energy Astrophysics. From 1980 to 1993, he served as the head of the theory office at the laboratory.

Ramaty had a profound scientific impact on the study of solar-flare physics, gamma-ray astronomy, and cosmic rays. Together with his longtime collaborator Richard Lingenfelter, he pioneered in establishing the field of solar gamma-ray-line astronomy using the abundance of elements in the sun and determining how sun flares are produced. He and Richard Lingenfelter first showed these techniques in 1967 and continued to refine them over the next 30 years through extensive studies. Ramaty also pioneered the field of gamma-ray-line astronomy with seminal studies of positron annihilation radiation, nuclear deexcitation lines, and nucleosynthetic decay lines in the interstellar medium and compact sources. His accomplishments are reflected in over 200 publications and more than 5,000 citations to his work in the literature.

Ramaty was the principal investigator on four NASA-funded theory initiatives and a co- or guest investigator on several space-science missions. Through the 1970s and 1980s, Ramaty's interpretation of gamma-ray data from the COS-B, SAS and HEAO-C missions guided the development of the highly successful Compton Gamma Ray Observatory. Ramaty also was a major influence in the success of the Solar Maximum Mission and the High Energy Solar Spectroscopic Imager (HESSI) mission. His colleagues point out that HESSI might not have been realized without his active encouragement and involvement.

Ramaty also served the high-energy astronomy community as chairman of the High-Energy Astronomy Division of the American Astronomical Society, chairman of the Division of Astrophysics and Divisional Councilor for Astrophysics of the

American Physical Society, and an associate editor of Physical Review Letters.

Ramaty received several major awards in his career. He was awarded the Senior U.S. Scientist Award from the Alexander von Humboldt Foundation in 1975. In 1980, Ramaty was honored with NASA Exceptional Scientific Achievement Award. In 1981, he became recipient of the Lindsay Award from Goddard Space Flight Center for his work on gamma-ray bursts. Lastly, one week before his death, he was notified that he was the winner of the 2001 Yodh Prize, given by the Commission on Cosmic Rays of the International Union of Pure and Applied Physics.

Reuven Ramaty died on April 8, 2001.

Scope and Content of Collection

The Reuven Ramaty Papers document his professional life as a research astrophysicist for over three decades. Well represented in the papers are his scientific writings including journal articles and books, conference presentations, research proposals, and contributions to theoretical initiatives and space-science missions. Also included are materials documenting conferences organized by Ramaty such as Gamma Ray Spectroscopy in Astrophysics conference held at Goddard Space Flight Center (1978), Tenth Texas Symposium on Relativistic Astrophysics held in Baltimore (1980), and F. B. McDonald Birthday Symposium held at Goddard Space Flight Center (1995). A significant part of the collection is correspondence files. Materials document Ramaty's service as an associate editor of Physical Review Letters, his research activities, and communication with colleagues, graduate students, and others.

The papers are arranged in six series: 1) WRITINGS, 2) CONFERENCES, 3) COMMITTEES, 4) SUBJECT FILES, 5) CORRESPONDENCE, and 6) BIOGRAPHICAL MATERIALS.

SERIES 1: WRITINGS

The WRITINGS series (1965-1997) mainly comprises Ramaty's papers published in refereed journals. The series is arranged in two subseries: A) Dated Publications and B) Miscellaneous Publications.

A) Dated Publications are organized chronologically and contain Ramaty's published articles, books, and short papers. Many articles are co-authored with his collaborators. Typically, folders include the reprint, handwritten or typed drafts of the paper, figures, graphs, slides, reprints or photocopies of reference articles, and related publication correspondence with editorial staff or collaborators.

B) Miscellaneous Publications are organized alphabetically by the title and include undated writings. Folders primarily contain typescripts of articles.

SERIES 2: CONFERENCES

The CONFERENCES series (1965-1997) documents Ramaty's professional activities at various conferences and is arranged in two subseries: A) Conference Presentations and B) Miscellaneous Materials.

A) Conference Presentations are organized chronologically and contain papers presented at the conferences and often later published in conference proceedings. Included materials are paper reprints, handwritten and typed drafts, overhead transparencies, slides, graphs and figures, and correspondence.

B) Miscellaneous Materials are organized alphabetically by the title of the conference and document conferences where Ramaty played a key role in planning and preparing for publication of new research. Included are materials documenting the Solar Maximum Mission workshop (1984-1985) and the High Energy Solar Physics workshop (1995) held at Goddard.

SERIES 3: COMMITTEES

The COMMITTEES series (1977-1986) documents Ramaty's professional activities in research projects, working groups, and committees. The series is arranged in two subseries: A) NASA Committees and B) National Research Committees and Working Groups.

A) NASA Committees are organized alphabetically by the name of the committee and contains materials related to NASA's theory research initiatives and space-science research missions. Included are handwritten and typed drafts of research proposals, correspondence, memorandums, agendas, viewgraphs of presented reports, meeting minutes. Notable committees include the Gamma Ray Observatory Support Group, MAX '90 Study Group, and Solar Physics Working Group.

B) National Research Committees and Working Groups are organized alphabetically by the name of the group and comprise materials documenting Ramaty's professional involvement with various science groups not affiliated with any institution in particular. Included are reports, meeting minutes, agendas, memorandums, handwritten and typed drafts of papers contributed to group publications, and correspondence. Among important committees are the Committee on Space, Astronomy, and Astrophysics (1974-1979), the Outlook for Space Working Group (1974-1975), and the Particle Acceleration Working Group (1976-1978).

SERIES 4: SUBJECT FILES

The SUBJECT FILES series (1979-1996) is ordered alphabetically by the title and comprises various materials reflecting Ramaty's professional involvement with space-science experiments and missions, his service at the American Astronomical Society and University Space Research Association, and his tenure as head of the theory office of the Laboratory for High Energy Astrophysics at Goddard. The series includes unfinished, undated, and untitled hand-written drafts, notes, and reference materials related to Ramaty's three major research themes such as annihilation of galactic positrons, galactic center annihilation radiation, and gamma-ray spectroscopy and solar flares. Also included are research proposals and reports on space-science experiments and missions. Among notable are materials related to Gamma-Ray Spectroscopy Experiment (GRSE), Solar High Energy Astrophysical Plasma Explorer (SHAPE), and NASA's astrophysics theory program.

SERIES 5: CORRESPONDENCE

The CORRESPONDENCE series (1963-1999) is arranged chronologically and contains Ramaty's communications with colleagues, graduate students, and others. Much of the correspondence reflects the fact that Ramaty spent much of his time critiquing the work of others, reviewing and evaluating research proposals and papers, and carrying on long-term relationships with his collaborators and postdoctoral fellows.

The series also includes correspondence related to his service as head of the theory office of the Laboratory for High Energy Astrophysics at Goddard Space Flight Center, Chairman of the High-Energy Astronomy Division of the American Astronomical Society, Chairman of the Division of Astrophysics, and Divisional Councilor for Astrophysics of the American Physical Society.

SERIES 6: BIOGRAPHICAL MATERIALS

The BIOGRAPHICAL MATERIALS (1966-1996) contains autobiographical sketches, curriculum vitae, resumes, photocopies of certificates, research statements, performance evaluations of Ramaty's research activities at Goddard, newspaper articles mentioning Ramaty's work, and group photographs.

Indexing Terms

The following terms have been used to index the description of this collection in the library's online public access catalog.

Subjects

Ramaty, R. -- Archives
United States. -- National Aeronautics and Space Administration
Goddard Space Flight Center
Laboratory for High Energy Astrophysics (Goddard Space Flight Center)
Astrophysicists -- United States -- Biography
Astrophysics
Gamma ray astronomy
Astronomy
Gamma rays

WRITINGS

Dated Publications

box 1, folder 1

Time Variations of Cosmic Rays - Outline for Ph.D. Thesis 1965

Note

June. Contains a photocopy of typescript.

box 1, folder 2

Galactic Cosmic-Ray Electrons 1966

Note

August 1. With R.E. Lingenfelter. Contains reprint, photocopy of typescript, graphs, figures, calculations, and correspondence.

- box 1, folder 3 **Cosmic-Ray Electron Lifetimes in the Galactic Disk and Halo 1966**
Note
December 12. With R.E. Lingenfelter. Contains reprint, photocopy of typescript, manuscripts, graphs, and correspondence regarding the article.
- box 1, folder 4 **On the Origin of Solar Flare Microwave Radio Bursts 1967**
Note
March 29. With R.E. Lingenfelter. Contains reprint, photocopy of typescript, manuscripts, negatives, figures, graphs, and correspondence.
- box 1, folder 5 **Solar Modulation and the Galactic Intensity of Cosmic-Ray Positrons and Negatrons 1968**
Note
January 15. With R.E. Lingenfelter. Contains reprint, photocopy of typescript, manuscripts, graphs, figures, and correspondence.
- box 1, folder 6 **Influence of the Ionized Medium on Synchrotron Emission of Intermediate Energy Electrons 1968**
Note
June 1. Part 1. Contains reprints, photocopy of typescript, figures, and reference articles.
- box 1, folder 7 **Influence of the Ionized Medium on Synchrotron Emission of Intermediate Energy Electrons 1968**
Note
June 1. Part 2. Contains graphs and manuscripts.
- box 1, folder 8 **Influence of the Ionized Medium on Synchrotron Emission of Intermediate Energy Electrons 1968**
Note
June 1. Part 3. Contains manuscripts.
- box 1, folder 9 **Influence of the Ionized Medium on Synchrotron Emission of Intermediate Energy Electrons 1968**
Note
June 1. Part 4. Contains manuscripts and correspondence.
- box 2, folder 1 **Determination of the Coronal Magnetic Field and the Radio-Emitting Electron Energy from a Type IV Solar... 1968**
Note
June 12. With R.E. Lingenfelter. Part 1. Contains reprints, preprint, annotated typescript, and figures.
- box 2, folder 2 **Determination of the Coronal Magnetic Field and the Radio-Emitting Electron Energy from a Type IV Solar... 1968**
Note
June 12. With R.E. Lingenfelter. Part 2. Contains graphs and a photocopy of tables and calculations.
- box 2, folder 3 **Determination of the Coronal Magnetic Field and the Radio-Emitting Electron Energy from a Type IV Solar... 1968**
Note
June 12. With R.E. Lingenfelter. Part 3. Contains manuscripts and correspondence.
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- box 2, folder 4 **Microwave and Hard X-Ray Bursts from Solar Flares 1969**
 Note
 January 14. With Stephen S. Holt. Part 1. Contains reprints, photocopy of typescript, figures, and manuscripts.
- box 2, folder 5 **Microwave and Hard X-Ray Bursts from Solar Flares 1969**
 Note
 January 14. With Stephen S. Holt. Part 2. Contains graphs and correspondence.
- box 2, folder 6 **Cosmic-Ray Deuterium and Helium-3 of Secondary Origin and the Residual Modulation of Cosmic Rays 1969**
 Note
 February. With R.E. Lingenfelter. Part 1. Contains reprints, galley proof, and typescripts.
- box 2, folder 7 **Cosmic-Ray Deuterium and Helium-3 of Secondary Origin and the Residual Modulation of Cosmic Rays 1969**
 Note
 February. With R.E. Lingenfelter. Part 2. Contains typescript, manuscripts, figures, graphs, calculations, and correspondence.
- box 3, folder 1 **Gyrosynchrotron Emission and Absorption in a Magnetoactive Plasma 1969**
 Note
 November. Part 1. Contains galley proof, typescripts, graphs, and figures.
- box 3, folder 2 **Gyrosynchrotron Emission and Absorption in a Magnetoactive Plasma 1969**
 Note
 November. Part 2. Contains manuscripts and graphs.
- box 3, folder 3 **Gyrosynchrotron Emission and Absorption in a Magnetoactive Plasma 1969**
 Note
 November. Part 3. Contains manuscripts.
- box 3, folder 4 **Gyrosynchrotron Emission and Absorption in a Magnetoactive Plasma 1969**
 Note
 November. Part 4. Contains correspondence.
- box 3, folder 5 **Anomalous Temporal Behaviour of NP 0532 1969**
 Note
 December 6. With Stephen S. Holt. Contains reprint, preprint, manuscripts, graphs, and correspondence.
- box 3, folder 6 **On the Nature of the High-Frequency Cutoffs of Type IV Solar Radio Bursts 1969**
 Note
 Contains reprint, galley proof, manuscripts, graphs, and correspondence.
- box 3, folder 7 **Physical Properties of the Radio-Emitting Region in SCO XR-1 1969**
 Note
 With G.R. Riegler. Contains reprint, preprint, page proof, typescript, manuscripts, figures, graphs, and correspondence.
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- box 4, folder 1 **Low-Energy Cosmic Ray Positrons and 0.51-MeV Gamma Rays from the Galaxy 1970**
 Note
 March 1. With F.W. Stecker and D. Misra. Part 1. Contains reprint and typescripts.
- box 4, folder 2 **Low-Energy Cosmic Ray Positrons and 0.51-MeV Gamma Rays from the Galaxy 1970**
 Note
 March 1. With F.W. Stecker and D. Misra. Part 2. Contains manuscripts, figure, graphs, and correspondence.
- box 4, folder 3 **Polarization Reversal of Solar Microwave Bursts 1970**
 Note
 April 4. With Stephen S. Holt. Contains reprint, manuscripts, and correspondence.
- box 4, folder 4 **Statistical Discrete-Source Model of Local Cosmic Rays 1970**
 Note
 April 20. With D.V. Reames and R.E. Lingenfelter. Part 1. Contains reprint, typescript, manuscripts, and figures.
- box 4, folder 5 **Statistical Discrete-Source Model of Local Cosmic Rays 1970**
 Note
 April 20. With D.V. Reames and R.E. Lingenfelter. Part 2. Contains graphs and correspondence.
- box 4, folder 6 **Energy Loss of Cosmic Rays in the Interplanetary Medium 1970**
 Note
 September, 21. With M.L. Goldstein and L.A. Fisk. Contains reprint, manuscript, figures, and correspondence.
- box 4, folder 7 **Pulsar Distributions Without Magnetic Decay 1970**
 Note
 October 24. With S.S. Holt. Contains reprint, typescript, manuscripts, figures, graphs, and correspondence.
- box 4, folder 8 **Interstellar Cosmic Ray Spectra from the Nonthermal Radio Background from 0.4 to 400 MHz 1970**
 Note
 With M.L. Goldstein and L.A. Fisk. Part 1. Contains manuscripts, typescripts, figures, and graphs.
- box 4, folder 9 **Interstellar Cosmic Ray Spectra from the Nonthermal Radio Background from 0.4 to 400 MHz 1970**
 Note
 With M.L. Goldstein and L.A. Fisk. Part 2. Contains graphs and correspondence.
- box 4, folder 10 **Pulsars and X-Ray-Emitting Supernova Remnants 1970**
 Note
 With S.S. Holt. Contains reprint, galley proof, typescripts, manuscripts, and correspondence.
- box 5, folder 1 **X-Rays from Centaurus A and the Far-Infrared Background Radiation 1971**
 Note
 February 5. Contains reprint, typescripts, manuscripts, and correspondence.
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- box 5, folder 2 **Low Energy Metagalactic Cosmic Rays 1971**
 Note
 July. With L.A. Fisk. Part 1. Contains preprints, figures, manuscripts, graphs, and correspondence.
- box 5, folder 3,
oversize FB43501 **Low Energy Metagalactic Cosmic Rays 1971**
 Note
 July. With L.A. Fisk. Part 2. Contains computer calculations.
- box 5, folder 4 **Ionization and Heating of the Gum Nebula by Energetic Particles from the Vela X Supernova 1971**
 Note
 October 1. With E.A. Boldt, S.A. Colgate, and J. Silk. Part 1. Contains galley proof, preprint, typescript, graphs, figures, and correspondence.
- box 5, folder 5 **Ionization and Heating of the Gum Nebula by Energetic Particles from the Vela X Supernova 1971**
 Note
 October 1. With E.A. Boldt, S.A. Colgate, and J. Silk. Part 2. Contains manuscripts.
- box 5, folder 6 **Origin of Cosmic Electrons from About 10 (squared) to 10 (to the sixth power) GeV 1971**
 Note
 November 8. With R.E. Lingenfelter. Contains reprint, typescripts, manuscripts, and correspondence.
- box 5, folder 7 **Compound Diffusion of Cosmic Rays 1971**
 Note
 With R.E. Lingenfelter. Contains reprint, typescript, manuscripts, figures, graphs, and correspondence.
- box 6, folder 1 **Inner Bremsstrahlung as a Source of X-Rays in the Steady State Universe 1972**
 Note
 February. With Vahe Petrosian. Part 1. Contains abstract, preprint, photocopies of reference articles, and correspondence.
- box 6, folder 2,
oversize FB43502 **Inner Bremsstrahlung as a Source of X-Rays in the Steady State Universe 1972**
 Note
 February. With Vahe Petrosian. Part 2. Contains typescripts of computer calculations.
- box 6, folder 3 **Influence of the Ionized Medium on Synchrotron Emission in Interstellar Space 1972**
 Note
 May 15. Part 1. Contains reprint, typescripts, and manuscripts.
- box 6, folder 4 **Influence of the Ionized Medium on Synchrotron Emission in Interstellar Space 1972**
 Note
 May 15. Part 2. Contains graphs, figures, and correspondence.
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box 6, folder 5

Origin of 200-keV Interplanetary Electrons 1972**Note**

October 9. With T.L. Cline and L.A. Fisk. Part 1. Contains reprints, typescripts, and manuscripts.

box 6, folder 6

Origin of 200-keV Interplanetary Electrons 1972**Note**

October 9. With T.L. Cline and L.A. Fisk. Part 2. Contains figures, graphs, reprints and photocopies of reference articles, and correspondence.

box 6, folder 7

Free-Free Absorption of Gyrosynchrotron Radiation in Solar Microwave Bursts 1972**Note**

November 15. With Vahe Petrosian. Part 1. Contains reprint, preprint, typescripts, manuscripts, figures, and graphs.

box 6, folder 8

Free-Free Absorption of Gyrosynchrotron Radiation in Solar Microwave Bursts 1972**Note**

November 15. With Vahe Petrosian. Part 2. Contains typescript and photocopies of reference articles.

box 6, folder 9

Free-Free Absorption of Gyrosynchrotron Radiation in Solar Microwave Bursts 1972**Note**

November 15. With Vahe Petrosian. Part 3. Contains correspondence.

box 7, folder 1

Transition Radiation as a Source of Cosmic X-Rays 1972**Note**

With R.D. Bleach. Contains reprint, typescripts, manuscripts, reprint and photocopies of reference articles, and correspondence.

box 7, folder 2

Nuclear Gamma Rays from Solar Flares 1973**Note**

January. With R.E. Lingenfelter. Contains preprint.

box 7, folder 3

Transition Radiation in Astrophysics 1973**Note**

May 1. With G.B. Youdh and X. Artru. Part 1. Contains reprint, preprint, typescripts, and manuscript.

box 7, folder 4

Transition Radiation in Astrophysics 1973**Note**

May 1. With G.B. Youdh and X. Artru. Part 2. Contains manuscripts, graphs, figures, and correspondence.

box 7, folder 5

Transition Radiation in Astrophysics 1973**Note**

May 1. With G.B. Youdh and X. Artru. Part 3. Contains photocopies of reference articles.

box 7, folder 6	<p>Cosmic Ray Sources: Evidence for Two Acceleration Mechanisms 1973</p> <p>Note</p> <p>May 18. With V.K. Balasubrahmanyam and J.F. Ormes. Part 1. Contains reprint, preprint, typescripts, manuscripts, graphs, and figures.</p>
box 7, folder 7	<p>Cosmic Ray Sources: Evidence for Two Acceleration Mechanisms 1973</p> <p>Note</p> <p>May 18. With V.K. Balasubrahmanyam and J.F. Ormes. Part 2. Contains reprints and photocopies of reference articles.</p>
box 7, folder 8	<p>Cosmic Ray Sources: Evidence for Two Acceleration Mechanisms 1973</p> <p>Note</p> <p>May 18. With V.K. Balasubrahmanyam and J.F. Ormes. Part 3. Contains correspondence.</p>
box 7, folder 9, oversize FB43503	<p>Cosmic Ray Sources: Evidence for Two Acceleration Mechanisms 1973</p> <p>Note</p> <p>May 18. With V.K. Balasubrahmanyam and J.F. Ormes. Part 4. Contains typescripts of computer calculations.</p>
box 7, folder 10	<p>Influence of Energy-Dependent Escape from the Galaxy on Cosmic Electrons 1973</p> <p>Note</p> <p>June 25. With R.F. Silverberg. Contains reprint, typescript, figure, graphs, and correspondence.</p>
box 7, folder 11	<p>X-Ray Spectrum of Cassiopeia A: Evidence for Iron Line Emission 1973</p> <p>Note</p> <p>August 15. With P.J. Serlemitsos, E.A. Boldt, S.S. Holt, and A.F. Briskin. Contains reprint, typescript, manuscripts, and correspondence.</p>
box 8, folder 1	<p>Consistency of Cosmic-Ray Source Abundances with Explosive Nucleosynthesis 1973</p> <p>Note</p> <p>August. With B. Kozlovsky. Contains preprint, typescript, manuscripts, graphs, reprints of reference articles, and correspondence.</p>
box 8, folder 2	<p>Consequences of the Large Energy Release During Neutron Star Formation 1973</p> <p>Note</p> <p>With Gerhard B?rner, S. A. Bludman, and Jeffrey M. Cohen. Contains typescripts, manuscripts, graph, figure, and correspondence.</p>
box 8, folder 3	<p>Gamma-Ray Bursts During Neutron Star Formation - and - Gamma-Ray Bursts and Transient X-Ray Sources 1973</p> <p>Note</p> <p>First article with J. M. Cohen, second article with U.D. Desai and S.S. Holt. Part 1. Contains preprint, typescripts, manuscripts, graphs, and figures.</p>
box 8, folder 4	<p>Gamma-Ray Bursts During Neutron Star Formation - and - Gamma-Ray Bursts and Transient X-Ray Sources 1973</p> <p>Note</p> <p>First article with J.M. Cohen, second article with U.D. Desai and S.S. Holt. Part 2. Contains correspondence and reprints and photocopies of reference articles.</p>

box 8, folder 5	<p>Neutron Propagation 1973</p> <p>Note</p> <p>Contains manuscripts, typescripts, and graphs.</p>
box 8, folder 6	<p>Positron Annihilation Radiation from Neutron Stars 1973</p> <p>Note</p> <p>With Gerhard B?rner and Jeffrey M. Cohen. Part 1. Contains preprints, typescripts, overhead transparencies, and manuscripts.</p>
box 8, folder 7	<p>Positron Annihilation Radiation from Neutron Stars 1973</p> <p>Note</p> <p>With G. B?rner and J.M. Cohen. Part 2. Contains reprints and photocopies of reference articles and correspondence.</p>
box 8, folder 8, oversize FB43504	<p>Positron Annihilation Radiation from Neutron Stars 1973</p> <p>Note</p> <p>With G. B?rner and J.M. Cohen. Part 3. Contains typescripts of computer calculations.</p>
box 8, folder 9	<p>Supernovae: Evidence for Suprathermal Nuclei from Iron and Boron Abundances 1973</p> <p>Note</p> <p>With J. Audoze. Contains manuscripts, typescripts, and correspondence.</p>
box 9, folder 1	<p>Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions 1974</p> <p>Note</p> <p>January 1. With C.C. Cheng and S. Tsuruta. Part 1. Contains reprint, preprint, typescripts, manuscripts, figures, and graphs.</p>
box 9, folder 2	<p>Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions 1974</p> <p>Note</p> <p>January 1. With C.C. Cheng and S. Tsuruta. Part 2. Contains manuscripts.</p>
box 9, folder 3	<p>Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions 1974</p> <p>Note</p> <p>January 1. With C.C. Cheng and S. Tsurura. Part 3. Contains photocopies of reference articles, and correspondence.</p>
box 9, folder 4	<p>Interpretation of the Observed Oxygen and Nitrogen Enhancements in Low-Energy Cosmic Rays 1974</p> <p>Note</p> <p>May 15. With L.A. Fisk and B. Kozlovsky. Contains reprint, preprint, typescripts, reference articles, and correspondence.</p>
box 9, folder 5	<p>478-keV and 431-keV Line Emissions from Alpha-Alpha Reactions 1974</p> <p>Note</p> <p>July 1. With B. Kozlovsky. Contains reprint, galley proof, typescript, manuscript, graphs, and correspondence.</p>
box 9, folder 6	<p>Cosmic Rays - Astronomy with Energetic Particles 1974</p> <p>Note</p> <p>October. With Peter Meyer and William R. Weber. Part 1. Contains reprint, page proof, manuscript, and typescripts.</p>

box 9, folder 7	<p>Cosmic Rays - Astronomy with Energetic Particles 1974</p> <p>Note</p> <p>October. With Peter Meyer and William R. Weber. Part 2. Contains typescripts, graphs, correspondence, and a photocopy of a reference article.</p>
box 10, folder 1	<p>Deuterium, Tritium, and Helium-3 Production in Solar Flares 1974</p> <p>Note</p> <p>November 1. With B. Kozlovsky. Part 1. Contains reprint, preprint, typescripts, and manuscripts.</p>
box 10, folder 2	<p>Deuterium, Tritium, and Helium-3 Production in Solar Flares 1974</p> <p>Note</p> <p>November 1. With B. Kozlovsky. Part 2. Contains figures, graphs, and correspondence.</p>
box 10, folder 3	<p>Comment on Gamma Ray Lines from Helium-4 1974</p> <p>Note</p> <p>With B. Kozlovsky. Contains reprint, manuscripts, typescript, and correspondence.</p>
box 10, folder 4	<p>Li Production in Alpha-Alpha Reactions 1974</p> <p>Note</p> <p>With B. Kozlovsky. Contains reprint, manuscripts, typescript, and correspondence.</p>
box 10, folder 5	<p>Neutron Propagation and 2.2 MeV Gamma-Ray Line Production in the Solar Atmosphere 1974</p> <p>Note</p> <p>With H.T. Wang. Part 1. Contains reprint, preprint, typescripts, manuscripts, graphs, figures, and correspondence.</p>
box 10, folder 6, oversize FB43505	<p>Neutron Propagation and 2.2 MeV Gamma-Ray Line Production in the Solar Atmosphere 1974</p> <p>Note</p> <p>With H.T. Wang. Part 2. Contains typescripts of computer calculations.</p>
box 10, folder 7	<p>Time-Dependent 2.2-MeV and 0.5-MeV Lines from Solar Flares 1975</p> <p>Note</p> <p>December 1. With H.T. Wang. Contains reprint, typescripts, manuscripts, graphs, and correspondence.</p>
box 10, folder 8	<p>Solar Gamma Rays 1975</p> <p>Note</p> <p>With B. Kozlovsky and R.E. Lingenfelter. Part 1. Contains reprint, typescripts, and manuscripts.</p>
box 10, folder 9	<p>Solar Gamma Rays 1975</p> <p>Note</p> <p>With B. Kozlovsky and R.E. Lingenfelter. Part 2. Contains negatives, figures, graphs, photocopies of reference articles, and correspondence.</p>
box 11, folder 1	<p>Solar Gamma-Ray Lines as Probes of Accelerated Particle Directionalities in Flares 1976</p> <p>Note</p> <p>February 1. With Carol Jo Crannell. Part 1. Contains reprint, preprint, manuscript, typescripts, photocopies of reference articles, and correspondence.</p>

box 11, folder 2	<p>Solar Gamma-Ray Lines as Probes of Accelerated Particle Directionalities in Flares 1976</p> <p>Note</p> <p>February 1. With Carol Jo Crannell. Part 2. Contains negatives, figures, and graphs.</p>
box 11, folder 3	<p>Formation of the 0.511 MeV Line in Solar Flares 1976</p> <p>Note</p> <p>December 1. With Carol Jo Crannel and Glenn Joyce. Part 1. Contains reprint, typescripts, and figures.</p>
box 11, folder 4	<p>Formation of the 0.511 MeV Line in Solar Flares 1976</p> <p>Note</p> <p>December 1. With Carol Jo Crennel and Glenn Joyce. Part 2. Contains manuscripts and graphs.</p>
box 11, folder 5	<p>Formation of the 0.511 MeV Line in Solar Flares 1976</p> <p>Note</p> <p>December 1. With Carol Jo Crennel and Glenn Joyce. Part 3. Contains photocopies and reprints of reference articles and correspondence.</p>
box 11, folder 6	<p>Electrons in a Closed Galaxy Model of Cosmic Rays 1976</p> <p>Note</p> <p>With N.J. Westergaard. Part 1. Contains reprint, preprint, typescripts with notes, and manuscripts.</p>
box 11, folder 7	<p>Electrons in a Closed Galaxy Model of Cosmic Rays 1976</p> <p>Note</p> <p>With N.J. Westergaard. Part 2. Contains graphs, negatives, and correspondence.</p>
box 12, folder 1	<p>Gamma-Ray and Microwave Evidence for Two Phases of Acceleration in Solar Flares 1976</p> <p>Note</p> <p>With T. Bai. Part 1. Contains reprint, page proof, preprint, typescripts, and manuscripts.</p>
box 12, folder 2	<p>Gamma-Ray and Microwave Evidence for Two Phases of Acceleration in Solar Flares 1976</p> <p>Note</p> <p>With T. Bai. Part 2. Contains figures, graphs, negatives, and correspondence.</p>
box 12, folder 3	<p>Gamma-Ray Lines from Interstellar Grains 1977</p> <p>Note</p> <p>January 1. With R.E. Lingenfelter. Part 1. Contains reprint, typescripts, manuscripts, graphs, negatives, photocopies of reference materials, and correspondence.</p>
box 12, folder 4, oversize FB43506	<p>Gamma-Ray Lines from Interstellar Grains 1977</p> <p>Note</p> <p>January 1. With R.E. Lingenfelter. Part 2. Contains typescripts of computer calculations.</p>
box 12, folder 5	<p>AL-26: a Galactic Source of Gamma-Ray Line Emission 1977</p> <p>Note</p> <p>April 1. With R.E. Lingenfelter. Contains reprint, galley proof, preprint, manuscripts, figures, graphs, reference materials, and correspondence.</p>

box 12, folder 6	<p>Solar Gamma-Ray Spectrum Between 4 and 8 MeV 1977</p> <p>Note</p> <p>June 1. With B. Kozlovsky and A.N. Suri. Part 1. Contains reprint, preprint, figures, and graphs.</p>
box 12, folder 7	<p>Solar Gamma-Ray Spectrum Between 4 and 8 MeV 1977</p> <p>Note</p> <p>June 1. With B. Kozlovsky and A.N. Suri. Part 2. Contains typescript and manuscripts.</p>
box 12, folder 8	<p>Solar Gamma-Ray Spectrum Between 4 and 8 MeV 1977</p> <p>Note</p> <p>June 1. With B. Kozlovsky and A.N. Suri. Part 3. Contains manuscripts, reference materials, figures, graphs, and negatives.</p>
box 12, folder 9	<p>Solar Gamma-Ray Spectrum Between 4 and 8 MeV 1977</p> <p>Note</p> <p>June 1. With B. Kozlovsky and A.N. Suri. Part 4. Contains correspondence.</p>
box 13, folder 1	<p>Narrow Lines from Alpha-Alpha Reactions 1977</p> <p>Note</p> <p>With B. Kozlovsky. Contains reprints, typescripts, manuscripts, graphs, and correspondence.</p>
box 13, folder 2	<p>Backscatter, Anisotropy, and Polarization of Solar Hard X-Rays 1978</p> <p>Note</p> <p>January 15. With T. Bai. Contains reprint, preprint, typescript, figures, graph, photocopy of a reference article, and a postcard requesting reprints.</p>
box 13, folder 3	<p>X-Ray and Gamma-Ray Line Production by Nonthermal Ions 1978</p> <p>Note</p> <p>February 15. With R.W. Bussard and K. Omidvar. Contains reprint.</p>
box 13, folder 4	<p>Gamma-Ray Lines: A New Window to the Universe 1978</p> <p>Note</p> <p>March. With R.E. Lingenfelter. Contains a copy of Physics Today magazine with the article and a manuscript titled "Gamma Rays from the Galactic Center."</p>
box 13, folder 5	<p>Mechanisms and Sites for Astrophysical Gamma Ray Line Production 1978</p> <p>Note</p> <p>Contains manuscript.</p>
box 13, folder 6	<p>Hard X-Ray Time Profiles and Acceleration Processes in Large Solar Flares 1979</p> <p>Note</p> <p>February 1. With T. Bai. Contains reprint, manuscript, photocopies of reference articles, and a postcard requesting reprints.</p>
box 13, folder 7	<p>Gamma-Ray Line Astronomy 1979</p> <p>Note</p> <p>March 8. With R.E. Lingenfelter. Part 1. Contains reprint, preprint, typescript, and manuscripts.</p>

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| box 13, folder 8 | <p>Gamma-Ray Line Astronomy 1979</p> <p>Note</p> <p>March 8. With R.E. Lingenfelter. Part 2. Contains negatives, figure, photocopies of reference articles, and correspondence.</p> |
| box 13, folder 9 | <p>Annihilation of Galactic Positrons 1979</p> <p>Note</p> <p>March 15. With R.W. Bussard and R.J. Drachman. Part 1. Contains reprint, manuscripts, and typescripts.</p> |
| box 13, folder 10 | <p>Annihilation of Galactic Positrons 1979</p> <p>Note</p> <p>March 15. With R.W. Bussard and R.J. Drachman. Part 2. Contains graphs, figures, slides, overhead transparencies with graphs, photocopies of reference articles, and correspondence related to the publication.</p> |
| box 14, folder 1 | <p>On the Origin of Positron Annihilation Radiation from the Galactic Center 1979</p> <p>Note</p> <p>April 23-26. With R.E. Lingenfelter and B. Kozlovsky. Contains typescripts of a paper presented at the newsroom of the spring meeting of the American Physical Society.</p> |
| box 14, folder 2 | <p>Nuclear Gamma-Rays from the Energetic Particle Interactions 1979</p> <p>Note</p> <p>July. With B. Kozlovsky and R.E. Lingenfelter. Part 1. Contains reprint and manuscripts.</p> |
| box 14, folder 3 | <p>Nuclear Gamma-Rays from the Energetic Particle Interactions 1979</p> <p>Note</p> <p>July. With B. Kozlovsky and R.E. Lingenfelter. Part 2. Contains typescript and graphs.</p> |
| box 14, folder 4 | <p>Nuclear Gamma-Rays from the Energetic Particle Interactions 1979</p> <p>Note</p> <p>July. With B. Kozlovsky and R.E. Lingenfelter. Part 3. Contains figures, negatives, and correspondence.</p> |
| box 14, folder 5 | <p>Astrophysical Gamma-Ray Spectroscopy 1979</p> <p>Note</p> <p>With R.E. Lingenfelter and B. Kozlovsky. Contains reprint, typescript, and correspondence.</p> |
| box 14, folder 6 | <p>Solar Gamma Rays Above 10 MeV 1979</p> <p>Note</p> <p>With Carol Jo Crannel and Hall Crannel. Contains manuscripts, typescripts, and correspondence.</p> |
| box 14, folder 7 | <p>Origin of the 5 March 1979 Gamma-Ray Transient: A Vibrating Neutron Star 1980</p> <p>Note</p> <p>September 11. With S. Bonazzola, T.L. Chine, D. Kazanas, and P. Meszaros. Part 1. Contains reprints, manuscripts, slides, figures, and negatives.</p> |
| box 14, folder 8 | <p>Origin of the 5 March 1979 Gamma-Ray Transient: A Vibrating Neutron Star 1980</p> <p>Note</p> <p>September 11. With S. Bonazzola, T.L. Cline, D. Kazanas, and P. Meszaros. Part 2. Contains a reference article, photocopies of newspaper clippings and correspondence.</p> |
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| box 14, folder 9 | <p>Cosmic Gamma-Ray Line Astronomy: The Recent HEAO-3 and Gamma-Ray Transient Results and Their Implications... 1980</p> <p>Note
Contains manuscript and notes.</p> |
| box 14, folder 10 | <p>Cosmic Gamma-Ray Lines: Theory 1980</p> <p>Note
With R.E. Lingenfelter. Contains reprint and typescript.</p> |
| box 14, folder 11 | <p>Annihilation Radiation from a Hot e+ -e- Plasma 1981</p> <p>Note
November 1. With P. Meszaros. Part 1. Contains reprint, typescripts, page proof, and manuscripts.</p> |
| box 14, folder 12 | <p>Annihilation Radiation from a Hot e+ -e- Plasma 1981</p> <p>Note
November 1. With P. Meszaros. Part 2. Contains figures, slides, negatives, graphs, and correspondence.</p> |
| box 15, folder 1 | <p>Synchrotron Cooling and Annihilation of an e+ -e- Plasma: The Radiation Mechanism for the 5 March, 1979... 1981</p> <p>Note
With R.E. Lingenfelter and R.W. Bussard. Contains reprint, page proof, typescripts, manuscripts, figure, overhead transparency, and correspondence.</p> |
| box 15, folder 2 | <p>On the Theory of Gamma-Ray Amplification Through Stimulated Annihilation Radiation 1982</p> <p>Note
May 1. With J.M. McKinley and F.C. Jones. Contains reprint, typescripts, manuscripts, graphs, figures, negatives, and correspondence. Manuscripts and typescripts include a version of this paper titled "Criteria for Gasar Action in Astrophysical Sources."</p> |
| box 15, folder 3 | <p>Acceleration and Propagation of Solar Flare Energetic Particles 1982</p> <p>Note
August. With M.A. Forman and E.G. Zweibel. Part 1. Contains typescript, figures, slides, negatives, and graphs.</p> |
| box 15, folder 4 | <p>Acceleration and Propagation of Solar Flare Energetic Particles 1982</p> <p>Note
August. With M.A. Forman and E.G. Zweibel. Part 2. Contains typescripts.</p> |
| box 15, folder 5 | <p>Acceleration and Propagation of Solar Flare Energetic Particles 1982</p> <p>Note
August. With M.A. Forman and E.G. Zweibel. Part 3. Contains manuscripts.</p> |
| box 15, folder 6 | <p>Acceleration and Propagation of Solar Flare Energetic Particles 1982</p> <p>Note
August. With M.A. Forman and S.G. Zweibel. Part 4. Contains correspondence.</p> |
| box 15, folder 7 | <p>Gamma-Ray Astronomy 1982</p> <p>Note
With R.E. Lingenfelter. Part 1. Contains reprint, typescripts, notes, and figures.</p> |
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- box 15, folder 8 **Gamma-Ray Astronomy 1982**
Note
With R.E. Lingenfelter. Part 2. Contains correspondence, slides, and negatives.
- box 16, folder 1 **On the Origin of the Positron Annihilation Radiation from the Direction of the Galactic Center 1982**
Note
With R.E. Lingenfelter. Contains reprint.
- box 16, folder 2 **Implications of High-Energy Neutron Observations from Solar Flares 1983**
Note
October 1. With R.J. Murphy and B. Kozlovsky. Contains reprint, page proof, typescripts, notes, figures, negatives, and correspondence.
- box 16, folder 3 **Gamma-Ray Lines and Neutrons from Solar Flares 1983**
Note
With R.J. Murphy, B. Kozlovsky, and R.E. Lingenfelter. Contains reprint, typescript, figures, negatives, slides, bibliographic data sheet, and a postcard requesting reprints.
- box 16, folder 4 **Origin of the Galactic Center Annihilation Radiation 1983**
Note
With R.E. Lingenfelter. Contains reprint and two typescripts.
- box 16, folder 5 **Positron-Electron Annihilation Radiation from the Galactic Center 1983**
Note
With R.E. Lingenfelter. Contains reprint, typescripts, manuscripts, and graphs.
- box 16, folder 6 **Nuclear Processes in the Jets of SS 433 1984**
Note
August 1. With B. Kozlovsky and R.E. Lingenfelter. Contains reprint, typescripts, manuscripts, a photocopy of newspaper clipping, reference materials, and correspondence.
- box 16, folder 7 **Particle Acceleration in Solar Flares 1987**
Note
With Miriam A. Forman. Published in Essays in Space Science - Proceedings of the F.B. McDonald 60th Birthday Symposium, edited by Ramaty with T.L. Cline and J.F. Ormes. Part 1. Contains typescripts of introductory remarks, preface, welcoming talk, symposium program brochure, Norman F. Ness' article, manuscripts of the publication plan, correspondence, and four photographs of James A. van Allen and Frank McDonald on March 13, 1956 in Iowa.
- box 16, folder 8 **Particle Acceleration in Solar Flares 1987**
Note
With Miriam A. Forman. Published in Essays in Space Science - Proceedings of the F.B. McDonald 60th Birthday Symposium, edited by Ramaty with T.L. Cline and J.F. Ormes. Part 2. Contains typescripts of articles from contributing authors.
- box 16, folder 9 **Particle Acceleration in Solar Flares 1987**
Note
With Miriam A. Forman. Published in Essays in Space Science - Proceedings of the F.B. McDonald 60th Birthday Symposium, edited by Ramaty with T.L. Cline and J.F. Ormes. Part 3. Contains typescripts of articles from contributing authors.
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| box 16, folder 10 | <p>Shock Acceleration of Electrons and Ions in Solar Flares 1985</p> <p>Note</p> <p>November 1. With Donald C. Ellison. Contains reprint.</p> |
| box 17, folder 1 | <p>Comptonized Bremsstrahlung and Annihilation Radiation: The Source of Gamma Ray Continuum and 0.511 MeV Line... 1985</p> <p>Note</p> <p>With J.M. McKinley. Part 1. Contains typescripts, manuscripts, graphs, figures, negatives, reference materials, and correspondence.</p> |
| box 17, folder 2,
oversize FB43507 | <p>Comptonized Bremsstrahlung and Annihilation Radiation: The Source of Gamma Ray Continuum and 0.511 MeV Line... 1985</p> <p>Note</p> <p>With J.M. McKinley. Part 2. Contains typescripts of computer calculations.</p> |
| box 17, folder 3 | <p>Secondary Antiproton Production in Relativistic Plasmas 1986</p> <p>Note</p> <p>January 16. With C.D. Dermer. Contains reprint, typescript, figures, correspondence, and article by C.D. Dermer on Secondary Production of Neutral Pi-Mesons and the Diffuse Galactic Gamma Radiation.</p> |
| box 17, folder 4 | <p>Directionality of Bremsstrahlung from Relativistic Electrons in Solar Flares 1986</p> <p>Note</p> <p>February 15. With C.D. Dermer. Contains reprint, page proofs, two typescripts, manuscripts, figures, calculations, negatives, and correspondence.</p> |
| box 17, folder 5 | <p>High Energy Processes in Solar Flares 1986</p> <p>Note</p> <p>With R.J. Murphy and C.D. Dermer. Contains preprint, typescript, figures, and correspondence.</p> |
| box 17, folder 6 | <p>Nuclear Processes in Solar Flares 1986</p> <p>Note</p> <p>Part 1. Contains reprint, preprint, typescripts, manuscripts, negatives, and graphs.</p> |
| box 17, folder 7 | <p>Nuclear Processes in Solar Flares 1986</p> <p>Note</p> <p>Part 2. Contains figures, graphs, and correspondence.</p> |
| box 17, folder 8 | <p>Pion-Decay Radiation and Two-Phase Acceleration in the June 3, 1982 Solar Flare 1986</p> <p>Note</p> <p>With R.J. Murphy and C.D. Dermer. Part 1. Contains reprints and typescripts.</p> |
| box 17, folder 9 | <p>Pion-Decay Radiation and Two-Phase Acceleration in the June 3, 1982 Solar Flare 1986</p> <p>Note</p> <p>With R.J. Murphy and C.D. Dermer. Part 2. Contains negatives, figures, graphs, and correspondence.</p> |
| box 18, folder 1 | <p>Positrons from Accelerated Particle Interactions 1987</p> <p>Note</p> <p>March 15. With R.E. Kozlovsky and R.E. Lingenfelter. Part 1. Contains preprint, reprint, typescript, and graphs.</p> |
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- box 18, folder 2 **Positrons from Accelerated Particle Interactions 1987**
Note
 March 15. With B. Kozlovsky and R.E. Lingenfelter. Part 2. Contains typescripts, figures, and negatives.
- box 18, folder 3 **Positrons from Accelerated Particle Interactions 1987**
Note
 March 15. With B. Kozlovsky and R.E. Lingenfelter. Part 3. Contains page proof and correspondence.
- box 18, folder 4 **High-Energy Processes in Solar Flares 1987**
Note
 March. With R.J. Murphy and C.D. Dermer. Contains reprint and page proof.
- box 18, folder 5 **Nuclear Processes and Accelerated Particles in Solar Flares 1987**
Note
 Part 1. Contains typescripts.
- box 18, folder 6 **Nuclear Processes and Accelerated Particles in Solar Flares 1987**
Note
 Part 2. Contains figures, negatives, and correspondence.
- box 18, folder 7 **Gamma-Ray, Neutron, and Hard X-Ray Studies and Requirements for a High-Energy Solar Physics Facility 1988**
Note
 With B.R. Dennis and A.G. Emslie. Part 1. Contains page proof and typescripts with notes.
- box 18, folder 8 **Gamma-Ray, Neutron, and Hard X-Ray Studies and Requirements for a High-Energy Solar Physics Facility 1988**
Note
 With B.R. Dennis and A.G. Emslie. Part 2. Contains reprints of reference articles and correspondence.
- box 18, folder 9 **Models of Gamma-Ray Production in Solar Flares 1988**
Note
 With J.A. Miller, Xin-Min Hua, and R.E. Lingenfelter. Contains preprint, typescripts, figures, and negatives.
- box 19, folder 1 **Deexcitation Gamma-Ray Line Emission from Solar Flare Magnetic Loops 1989**
Note
 June 1. With Xin-Min Hua and R.E. Lingenfelter. Part 1. Contains page proof, typescripts, preprint, and figures.
- box 19, folder 2 **Deexcitation Gamma-Ray Line Emission from Solar Flare Magnetic Loops 1989**
Note
 June 1. With Xin-Min Hua and R.E. Lingenfelter. Part 2. Contains figures, graphs, manuscripts, negatives, and correspondence.
- box 19, folder 3 **Gamma-Ray Evidence for a Stellar-Mass Black Hole Near the Galactic Center 1989**
Note
 With R.E. Lingenfelter. Contains page proof, typescript, notes, and a letter from the New York Academy of Sciences.
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- box 19, folder 4 **Origin of the Annihilation Radiation from the Galactic Center Region 1989**
 Note
 With R.E. Lingenfelter. Contains two typescripts of the article.
- box 19, folder 5 **Ion and Relativistic Electron Transport in Solar Flares 1990**
 Note
 June. With J.A. Miller, Xin-Min Hua, and R.E. Lingenfelter. Contains page proof, typescript, figures, and correspondence.
- box 19, folder 6 **Positron Diagnostics of the Galaxy 1990**
 Note
 November. Contains reprint.
- box 19, folder 7 **Gamma Ray Bursts and the Birthrate of Bare Neutron Stars 1990**
 Note
 With A. Dar, S. Nussinov, and B. Kozlovsky. Contains typescripts with notes.
- box 19, folder 8 **Solar Abundances from Gamma-Ray Spectroscopy: Comparisons with Energetic Particle, Photospheric, and... 1991**
 Note
 April 20. With R.J. Murphy, B. Kozlovsky, and D.V. Reames. Contains page proof, preprint, negatives, figures, and correspondence.
- box 19, folder 9 **Positron Annihilation in the Interstellar Medium 1991**
 Note
 September 1. With N. Guessoum and R.E. Lingenfelter. Contains page proof, preprint, figures, negatives, and correspondence.
- box 19, folder 10 **Annihilation Near the Center 1991**
 Note
 September. With R.E. Lingenfelter. Contains reprint and correspondence.
- box 19, folder 11 **Accelerated Particles in Solar Flares 1991**
 Note
 With G.M. Simnett. Part 1. Contains typescript, negatives, figures, and notes.
- box 19, folder 12 **Accelerated Particles in Solar Flares 1991**
 Note
 With G.M. Simnett. Part 2. Contains correspondence and reference articles.
- box 20, folder 1 **High-Energy Gamma-Ray Emission from Pion Decay in a Solar Flare 1992**
 Note
 April 20. With Natalie Mandzhavidze. Contains reprint, typescripts, manuscripts, negatives, and correspondence.
- box 20, folder 2 **Diffuse 0.511 MeV Line Emission and the Distribution of Positron Annihilation in the Galaxy 1992**
 Note
 September. Contains correspondence.
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- box 20, folder 3 **High Energy Astrophysics in Solar Flares 1992**
Note
With E.L. Chupp. Contains typescripts, notes, and correspondence.
- box 20, folder 4 **Gamma Rays From Pion Decay: Evidence for Long Term Trapping of Particles in Solar Flares 1992**
Note
With Natalie Mandzhavidze. Contains typescripts, page proof, correspondence, a photocopy of newspaper clipping, and reference articles.
- box 20, folder 5 **High Energy Particle Emissions 1992**
Note
Contains page proof and correspondence.
- box 20, folder 6 **Neutrinos from Optically Quiet Births of Neutron Stars 1992**
Note
With Arnon Dar. Contains reprint.
- box 20, folder 7 **On the Origin of Variable 511 keV Line Emission from the Galactic Center Region 1992**
Note
With M. Leventhal, K.W. Chan, and R.E. Lingenfelter. Contains reprint, typescript, page proof, figures, correspondence, and photocopies of reference articles.
- box 20, folder 8 **Gamma Ray Line Radiation 1993**
Note
With R. E. Lingenfelter. Contains typescripts and correspondence.
- box 20, folder 9 **High Energy Astrophysics in Solar Flares 1993**
Note
With E.L. Chupp. Contains reprint and correspondence.
- box 20, folder 10 **Particle Acceleration in Solar Flares 1993**
Note
With Natalie Mandzhavidze. Contains reprint and preprint.
- box 20, folder 11 **Galactic 0.511 MeV Line Emission 1994**
Note
June. With J.G. Skibo and R.E. Lingenfelter. Contains page proof, preprint, typescript, notes, and correspondence.
- box 20, folder 12 **Gamma Ray Continuum and Millimeter Wave Emissions from Solar Flares 1994**
Note
December 1. With R.A. Schwartz, Shinzo Enome, and Hiroshi Nakajima. Contains page proof, typescripts, and correspondence.
- box 20, folder 13 **Gamma-Ray Lines from the Orion Complex 1995**
Note
January 1. With B. Kozlovsky and R.E. Lingenfelter. Contains reprint, typescript, page proof, figures, and correspondence.

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| box 20, folder 14 | <p>Light Isotopes, Extinct Radioisotopes, and Gamma Ray Lines From Low Energy Cosmic Ray Interactions 1996</p> <p>Note</p> <p>January 10. With B. Kozlovsky and R.E. Lingenfelter. Contains preprints, page proof, and correspondence.</p> |
| box 20, folder 15 | <p>Anisotropic Broad Nuclear Gamma-Ray Lines: Application to the Comptel Observations of Orion 1997</p> <p>Note</p> <p>July 20. Contains reprint, page proofs, typescript, and correspondence.</p> |
| box 21, folder 1 | <p>Light Elements and Cosmic Rays in the Early Galaxy 1997</p> <p>Note</p> <p>October 20. With B. Kozlovsky, R.E. Lingenfelter, and H. Reeves. Contains reprint, typescript, and correspondence.</p> |

Miscellaneous publications

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| box 21, folder 2 | <p>Angle Dependent Spectra of Solar Flare Neutrons Revisited 0</p> <p>Note</p> <p>With Xin-Min Hua, B. Kozlovsky, and R.E. Lingenfelter. Contains typescript, overhead transparency, and figures.</p> |
| box 21, folder 3 | <p>Scientific Objectives of High Resolution - High Sensitivity Celestial Gamma-Ray Observations 0</p> <p>Note</p> <p>Contains typescript.</p> |
| box 21, folder 4 | <p>Miscellaneous writings 0</p> <p>Note</p> <p>Contains notes, abstract on Propagation of Cosmic Rays and Gamma Ray Lines and Positrons in the Galaxy, and a figure.</p> |

CONFERENCES

Conference Presentations

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| box 21, folder 5 | <p>Influence of Geometric Shielding on C-14 Production and Content 1965</p> <p>Note</p> <p>Presented at Magnetism and the Cosmos Symposium held at the School of Physics at the University of Newcastle-upon-Tyne. Part 1. Contains reprint, galley proof, typescripts, and manuscripts.</p> |
| box 21, folder 6 | <p>Influence of Geometric Shielding on C-14 Production and Content 1965</p> <p>Note</p> <p>Presented at Magnetism and the Cosmos Symposium held at the Physics Department at the University of Newcastle-upon-Tyne, England. Part 2. Contains, graphs, figures, typescript, and correspondence.</p> |

box 21, folder 7

High Energy Nuclear Reactions on the Sun 1967**Note**

January. With R.E. Lingenfelter. Presented at High Energy Nuclear Reactions in Astrophysics Conference held at the University of Pennsylvania. Part 1. Contains typescripts and manuscripts.

box 21, folder 8

High Energy Nuclear Reactions on the Sun 1967**Note**

January. With R.E. Lingenfelter. Presented at High Energy Nuclear Reactions in Astrophysics conference held at the University of Pennsylvania. Part 2. Contains manuscripts, figures, and typescripts.

box 21, folder 9

High Energy Nuclear Reactions on the Sun 1967**Note**

January. With R.E. Lingenfelter. Presented at High Energy Nuclear Reactions in Astrophysics conference held at the University of Pennsylvania. Part 3. Contains figures, graphs, and correspondence.

box 22, folder 1

Cosmic Ray Deuterium and Helium-3 Nuclei 1967**Note**

June 19-30. With R.E. Lingenfelter. Presented at the Tenth International Conference on Cosmic Rays in Calgary, Canada. Part 1. Contains conference brochure, manuscripts, typescripts, and graphs.

box 22, folder 2

Cosmic Ray Deuterium and Helium-3 Nuclei 1967**Note**

June 19-30. With R.E. Lingenfelter. Presented at the Tenth International Conference on Cosmic Rays in Calgary, Canada. Part 2. Contains three notebooks and correspondence.

box 22, folder 3

Low Energy Cosmic Ray Positrons 1969**Note**

April 25. Presented at the 15th Annual Meeting of the American Geophysical Union. Contains correspondence.

box 22, folder 4

Low Energy Cosmic Ray Positrons and 0.51MeV Gamma Rays from the Galaxy 1969**Note**

August 25 - September 4. Presented at the 11th International Conference on Cosmic Rays in Budapest, Hungary. Contains reprint, conference brochure, and correspondence.

box 22, folder 5

Astrophysical and Geophysical Variations in C-14 Production 1969**Note**

August 11-15. With R.E. Lingenfelter. Presented at Nobel Symposium 12 in Uppsala, Sweden. Part 1. Contains symposium brochures, paper typescripts, and photocopies of reference articles.

box 22, folder 6

Astrophysical and Geophysical Variations in C-14 Production 1969**Note**

August 11-15. With R.E. Lingenfelter. Presented at Nobel Symposium 12 in Uppsala, Sweden. Part 2. Contains manuscripts.

box 22, folder 7

Astrophysical and Geophysical Variations in C-14 Production 1969**Note**

August 11-15. With R.E. Lingenfelter. Presented at Nobel Symposium 12 in Uppsala, Sweden. Part 3. Contains graphs, figures, and correspondence.

box 22, folder 8

Effects of Propagation and Source Distribution on Cosmic Ray Composition and Anisotropy 1971**Note**

March 23-25. With R.E. Lingenfelter. Presented at Discussion on the Isotopic Composition of Cosmic Ray Nuclei at Danish Space Research Institute, Denmark. Contains preprint, manuscripts, graphs, figures, and correspondence.

box 22, folder 9

Cosmic Ray Positrons and Electrons and the Anisotropy of the Galactic Cosmic Rays 1971**Note**

April 26-29. With H.T. Wang. Presented at the American Physical Society meeting in Washington D.C. Contains abstract, manuscript, graphs, and figures.

box 23, folder 1

Cosmic-Ray Effects in the Gum Nebula 1971**Note**

May 18. With E.A. Boldt. Presented at the Gum Nebula and Related Problems Symposium held at Goddard Space Flight Center in Greenbelt, Maryland. Contains preprint, figure, typescripts, graphs, manuscripts, and correspondence.

box 23, folder 2

Cosmic Ray Propagation and Source Distribution 1971**Note**

With R.E. Lingenfelter. Presented at the 12th International Conference on Cosmic Rays in Australia. Contains two typescripts of the paper.

box 23, folder 3

High Energy Gamma Rays From the Galactic Center 1971**Note**

Presented at the 135th Meeting of the American Astrophysical Society in Amherst, Massachusetts. Contains manuscripts and correspondence.

box 23, folder 4

Theory of Solar Microwave Bursts 1972**Note**

September 28-30. Presented at the Symposium on High Energy Phenomena on the Sun at Goddard Space Flight Center in Greenbelt, Maryland. Part 1. Contains symposium brochure, reprint, typescript, and manuscripts.

box 23, folder 5

Theory of Solar Microwave Bursts 1972**Note**

September 28-30. Presented at the Symposium on High Energy Phenomena on the Sun at Goddard Space Flight Center in Greenbelt, Maryland. Part 2. Contains graphs, figures, overhead transparencies, and photocopies of reference articles.

box 23, folder 6

Nuclear Gamma Rays from Solar Flares 1973**Note**

August 17-30. With R.E. Lingenfelter. Presented at the 13th International Cosmic Ray Conference in Denver, Colorado. Part 1. Contains abstract, reprint, preprint, typescripts, and manuscripts.

box 23, folder 7

Nuclear Gamma Rays from Solar Flares 1973**Note**

August 17-30. With R.E. Lingenfelter. Presented at the 13th International Cosmic Ray Conference in Denver, Colorado. Part 2. Contains manuscripts, figures, graphs, and correspondence.

box 23, folder 8

Nuclear Gamma Rays from Solar Flares 1973**Note**

With R.E. Lingenfelter. Presented at the 13th International Cosmic Ray Conference in Denver, Colorado. Part 3. Contains reprints and photocopies of reference articles.

box 23, folder 9

Origin of the Electron-to-Proton Ratio in Cosmic Rays 1973**Note**

August 17-30. With J.M. Cohen. Presented at the 13th International Cosmic Ray Conference. Contains, abstract, typescript of the paper, manuscripts, graphs, reference articles, and correspondence.

box 24, folder 1

Cooling Blackbody: A Mechanism for Cosmic Gamma-Ray Bursts 1973**Note**

September 20-21. With J.M. Cohen. Presented at the Los Alamos Conference on Transient Cosmic Gamma- and X-Ray Sources. Contains abstract, typescripts, manuscripts, overhead transparencies, slides, and photocopies of reference articles.

box 24, folder 2

Gamma-Ray Lines from Solar Flares 1974**Note**

June 11-14. With R.E. Lingenfelter. Presented at the Solar Gamma-, X-, and EUV-Radiation Symposium in Buenos Aires, Argentina. Part 1. Contains reprints, preprint, typescripts, and manuscripts.

box 24, folder 3

Gamma-Ray Lines from Solar Flares 1974**Note**

June 11-14. With R.E. Lingenfelter. Presented at the Solar Gamma-, X-, and EUV-Radiation Symposium in Buenos Aires, Argentina. Part 2. Contains figures, graphs, and correspondence.

box 24, folder 4

Solar He-3 Information from Nuclear Reactions in Flares 1974**Note**

August 19-21. With B. Kozlovsky. Presented at the Seminar on Particle Acceleration and Nuclear Reactions in Space in Leningrad, Russia. Part 1. Contains typescripts.

box 24, folder 5

Solar He-3 Information from Nuclear Reactions in Flares 1974**Note**

August 19-21. With B. Kozlovsky. Presented at the Seminar on Particle Acceleration and Nuclear Reactions in Space, Leningrad, Russia. Part 2. Contains manuscript, notes, figures, photocopies of reference articles, and correspondence.

box 24, folder 6

Solar He-3 Information from Nuclear Reactions in Flares 1974**Note**

August 19-21. With B. Kozlovsky. Presented at the Seminar on Particle Acceleration and Nuclear Reactions in Space. Part 3. Contains a collection of articles dedicated to the 50th anniversary of the Institute of Physics and Technology named after A.F. Ioffe and reprints of publications of Russian scientists including S.V. Viktorov, G.E. Kocharov, V.I. Chesnokov, I. P. Mazets, S.V. Golenetsky, V.N. Ilinsky, Y.A. Gurian, T.V. Kharitonov, V.S. Ptuskin, O.P. Shmeleva, and S.I. Syrovatskii.

box 24, folder 7

Origin and Implications of Gamma Rays from Solar Flares 1975**Note**

April 28 - May 1. Presented at the Annual Meeting of the American Physical Society in Washington D.C. Contains preprint, typescript, and correspondence.

box 24, folder 8

Gamma Rays and High Frequency Radio Emission from Large Solar Flares 1976**Note**

May. Presented at the United States-Japan Cooperative Seminar on High Energy Phenomena in Solar Flares held in Tokyo, Japan. Contains typescript and correspondence.

box 24, folder 9

Gamma Rays from the De-Excitation of C-12 *(15.11 MeV) and C-12 *(4.44 MeV) as Probes of Energetic Particles... 1977**Note**

May 24-27. With Carol Jo Crannell and Hall Crannell. Presented at the Symposium on Recent Advances in Gamma-Ray Astronomy in Frascati, Italy. Contains preprint, typescript, manuscripts, slides, figures, and graphs.

box 25, folder 1

Gamma Ray Spectroscopy in Astrophysics: Theoretical Overview 1978**Note**

April 28-29. With T.L. Cline and R. Weaver. Presented at the Gamma Ray Spectroscopy in Astrophysics Symposium held at Goddard Space Flight Center in Greenbelt, Maryland. Part 1. Contains program brochure, typescripts and manuscripts of the presentation, figures, and negatives.

box 25, folder 2

Gamma Ray Spectroscopy in Astrophysics: Theoretical Overview 1978**Note**

April 28-29. With T.L. Cline and R. Weaver. Presented at the Gamma Ray Spectroscopy in Astrophysics Symposium held at Goddard Space Flight Center in Greenbelt, Maryland. Part 2. Contains correspondence.

box 25, folder 3

Gamma Ray Spectroscopy in Astrophysics: Theoretical Overview 1978**Note**

April 28-29. Presented at the Gamma Ray Spectroscopy in Astrophysics Symposium held in Goddard Space Flight Center in Greenbelt, Maryland. Part 3. Contains audio recording with L. Peterson's concluding remarks and Robert Cooper's presentation.

box 25, folder 4

Energetic Particles in Solar Flares 1978**Note**

October. Presented at the Second Skylab Workshop on Solar Flares held at Goddard Space Flight Center in Greenbelt, Maryland. Part 1. Contains reprint, preprint of the proceedings, and a review.

box 25, folder 5

Energetic Particles in Solar Flares 1978**Note**

October. Presented at the Second Skylab Workshop on Solar Flares held at Goddard Space Flight Center in Greenbelt, Maryland. Part 2. Contains typescript of chapter 4 in the proceedings.

box 25, folder 6

Energetic Particles in Solar Flares 1978**Note**

October. Presented at the Second Skylab Workshop on Solar Flares held at Goddard Space Flight Center in Greenbelt, Maryland. Part 3. Contains typescripts, figures, and correspondence.

box 25, folder 7

Energetic Particles in Solar Flares 1978**Note**

October. Presented at the Second Skylab Workshop on Solar Flares held at Goddard Space Flight Center in Greenbelt, Maryland. Part 4. Contains correspondence, typescripts, and manuscripts.

box 25, folder 8

Energetic Particles in Solar Flares 1978**Note**

October. Presented at the Second Skylab Workshop on Solar Flares held at Goddard Space Flight Center in Greenbelt, Maryland. Part 5. Contains typescript, graphs, figures, and negatives.

box 26, folder 1

Energetic Particles in Solar Flares 1979**Note**

January. Presented at the Conference on Particle Acceleration in Astrophysics held in La Jolla, California. Contains abstract, typescripts, manuscripts, negatives, overhead transparencies, figures, and correspondence.

box 26, folder 2

Interpretations and Implications of Gamma Ray Lines from Solar Flares, the Galactic Center and Gamma Ray... 1980**Note**

November 27-28. With R.E. Lingenfelter. Presented at the Royal Society Meeting on Gamma-Ray Astronomy in London, Britain. Contains program brochure, typescripts of the paper, abstract, slides, figures, negatives, and correspondence.

box 26, folder 3

Gamma Ray Lines from the Galactic Center and Gamma Ray Transients 1980**Note**

December 15-19. With D. Leiter and R.E. Lingenfelter. Presented at the 10th Texas Symposium on Relativistic Astrophysics in Baltimore, Maryland. Part 1. Contains typescripts, figures, negative, and correspondence.

box 26, folder 4

Gamma Ray Lines from the Galactic Center and Gamma Ray Transients 1980**Note**

December 15-19. With D. Leiter and R.E. Lingenfelter. Presented at the 10th Texas Symposium on Relativistic Astrophysics in Baltimore, Maryland. Part 2. Contains symposium brochure, list of symposium workshops, typescript of preface by Ramaty and F.C. Jones, photocopies of reference materials, typescript of funding proposal, preliminary list of speakers and conference proposal.

box 26, folder 5

Gamma Ray Lines from the Galactic Center and Gamma Ray Transients 1980**Note**

December 15-19. With D. Leiter and R.E. Lingenfelter. Presented at the 10th Texas Symposium on Relativistic Astrophysics in Baltimore, Maryland. Part 3. Contains typescripts and photocopies of papers and notes.

box 26, folder 6

Gamma Ray Lines from the Galactic Center and Gamma Ray Transients 1980**Note**

December 15-19. With D. Leiter and R.E. Lingenfelter. Presented at the 10th Texas Symposium on Relativistic Astrophysics in Baltimore, Maryland. Part 4. Contains correspondence, inclusive dates 1979-1980.

box 26, folder 7

Gamma Ray Lines from the Galactic Center and Gamma Ray Transients 1980**Note**

December 15-19. With D. Leiter and R.E. Lingenfelter. Presented at the 10th Texas Symposium on Relativistic Astrophysics in Baltimore, Maryland. Part 5. Contains correspondence, inclusive dates 1980-1982.

box 26, folder 8

Gamma Ray Lines from Solar Flares and Cosmic Ray Transients 1981**Note**

August 5-8. With R.E. Lingenfelter and B. Kozlovsky. Presented at the Workshop on Gamma Ray Transients and Related Astrophysical Phenomena. Contains reprint, negatives, figures, and graph.

box 26, folder 9

On the Theory of Gamma Ray Amplification Through Stimulated Annihilation Radiation (GRASAR) 1981**Note**

August 5-8. With J.M. McKinley and F.C. Jones. Presented at the Workshop on Gamma Ray Transients and Related Astrophysical Phenomena, La Jolla, California. Contains reprint, abstract, notes, typescript of the proceedings, and correspondence.

box 26, folder 10

Advances in Gamma-Ray Line Astronomy 1982**Note**

May 18-19. With R.E. Lingenfelter. Presented at the Symposium on Gamma-Ray Astronomy in Perspective of Future Experiments in Ottawa, Canada. Contains reprint and typescripts.

box 26, folder 11

Implications of Gamma-Ray Line Observations and Future Prospects for Line Detections 1982**Note**

May 18-19. With R.E. Lingenfelter. Presented at the Symposium on Gamma Ray Astronomy in Perspective of Future Experiments in Ottawa, Canada. Contains typescript and correspondence.

box 26, folder 12

Gamma-Ray Line Astronomy 1982**Note**

August 19. With R.E. Lingenfelter. Presented at the XVIII General Assembly of the IAV on Galactic Astrophysics and Gamma-Ray Astronomy held in Patras, Greece. Contains reprint, page proof, typescript with notes, and correspondence.

box 26, folder 13

Nuclear Processes in Solar Flares 1982**Note**

October 5-8. Presented at the U.S.-Japan Seminar on Recent Advances in the Understanding of Solar Flares. Contains seminar program and brochures, correspondence, and notes.

box 26, folder 14

Neutrons and Gamma Rays from Solar Flares 1983**Note**

Summer. With R.J. Murphy. Presented at the Workshop on High Energy Transients in Astrophysics held in Lick Observatory, California. Contains typescript and a letter from workshop organizing committee.

box 26, folder 15

Solar Flare Neutrons and Gamma Ray Lines 1983**Note**

August 22 - September 3. With R.E. Lingenfelter, R.J. Murphy, and B. Kozlovsky. Presented at the 18th International Cosmic Conference held in Bangalore, India. Contains abstract and correspondence.

box 26, folder 16

Gamma Ray Line Astronomy 1984**Note**

February. Presented at the 4th Moriond Astrophysical Meeting in La Plagne, France. Contains typescript and correspondence.

box 26, folder 17

Solar-Flare Neutrons and Gamma Rays 1984**Note**

June. With R.J. Murphy. Presented at the Symposium on Solar Maximum Analysis held in Graz, Austria. Contains reprint, typescript, figures, graphs, negatives, and correspondence.

box 26, folder 18

Neutron and Gamma-Ray Signatures for Particle Acceleration in Solar Flares 1984**Note**

August 28-September 7. With R.J. Murphy. Presented at the Workshop on Plasma Astrophysics in Varenna, Italy. Contains reprint and typescript.

box 26, folder 19

Topics in Gamma Ray Astronomy 1984**Note**

December. With R.E. Lingenfelter. Presented at the 12th Symposium on Relativistic Astrophysics. Contains symposium brochure, typescript, notes, negatives, figures, and correspondence.

box 27, folder 1

Abundances From Solar-Flare Gamma-Ray Line Spectroscopy 1985**Note**

August 11-23. With R.J. Murphy and D.J. Forrest. Presented at the 19th International Cosmic Ray Conference in La Jolla, California. Contains typescripts, figures, graphs, notes, negatives, conference brochures, and correspondence.

box 27, folder 2

Gamma-Ray Line Astrophysics 1985**Note**

August 11-23. With R.E. Lingenfelter. Presented at the 19th International Cosmic Ray Conference in La Jolla, California. Contains typescripts.

box 27, folder 3

Pion-Decay Radiation and Two-Phase Acceleration in the June 3, 1982. 1986**Note**

June 30-July 11. With R.J. Murphy and C.D. Dermer. Presented at the XXVI Plenary Meeting of the Committee on Space Research in Toulouse, France. Contains typescripts, a recommendation of the referee, and conference brochures.

- box 27, folder 4 **Cosmic Gamma Ray Lines 1986**
Note
June 30-July 11. With R.E. Lingenfelter. Presented at the XXVI Plenary Meeting of the Committee on Space Research in Toulouse, France. Contains typescript and a recommendation of the referee.
- box 27, folder 5 **Neutral Radiations and Particle Acceleration at the Sun 1987**
Note
August 2-15. Presented at the 20th International Cosmic Ray Conference in Moscow, Russia. Part 1. Contains paper typescript, notes, overhead transparencies, and typescripts of conference participants' articles.
- box 27, folder 6 **Neutral Radiations and Particle Acceleration at the Sun 1987**
Note
August 2-15. Presented at the 20th International Cosmic Ray Conference in Moscow, Russia. Part 2. Contains conference brochures.
- box 27, folder 7 **Theory of Gamma Ray and Neutron Emissions from Solar Flares 1987**
Note
December 14-16. Presented at the Workshop on Nuclear Spectroscopy of Astrophysical Sources, Washington D.C. Contains conference abstracts.
- box 27, folder 8 **Nuclear Processes and Acceleration of Particles in Solar Flares and Galactic Sources 1989**
Note
August. Presented at the International Nuclear Physics Conference in Sao Paulo, Brazil. Contains conference brochures and correspondence.
- box 27, folder 9 **Gamma-Ray Evidence for a Stellar-Mass Black Hole Near the Galactic Center 1989**
Note
December 5. Presented at the 14th Texas Symposium on Relativistic Astrophysics. Contains reprint.
- box 27, folder 10 **Positronium and Positron Annihilation in the Galaxy 1990**
Note
January 6-19. With R.E. Lingenfelter. Presented at the XXI International Cosmic Ray Conference in Adelaide, Australia. Contains typescript of abstract, notes, and correspondence.
- box 27, folder 11 **Ion Acceleration by Alfvén Turbulence in Solar Flares 1990**
Note
January 6-19. With James A. Miller and Nidhal Guessoum. Presented at the XXI International Cosmic Ray Conference in Adelaide, Australia. Contains typescript of paper abstract and correspondence.
- box 27, folder 12 **Galactic Positron Annihilation Radiation 1990**
Note
September 13. With R.E. Lingenfelter. Presented at the Symposium on Frontiers in Cosmic Physics in New York City. Contains paper typescripts and correspondence.
- box 27, folder 13 **Positron Annihilation Radiation from the Galactic Center Region 1990**
Note
December 10-13. With R.E. Lingenfelter. Presented at the International Symposium on Gamma Ray Line Astrophysics in Saclay, France. Contains paper typescript.
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- box 27, folder 14 **Gamma Ray Line Astrophysics 1990**
 Note
 December 10-13. With Nikos Prantzos. Contains paper typescript and correspondence.
- box 27, folder 15 **Diffuse Galactic Gamma Ray Line Emission 1992**
 Note
 March 17-20. Presented at the Conference on Recent Advances in High Energy Astronomy in Toulouse, France. Contains typescript of paper abstract.
- box 27, folder 16 **Acceleration in Solar Flares: Interacting Particles Versus Interplanetary Particles 1992**
 Note
 August 28-September 9. With N. Mandzhavidze, B. Kozlovsky, and J.G. Skibo. Contains paper typescripts, figures, correspondence, and conference program.
- box 27, folder 17 **Diffuse 0.511 MeV Line Emission and the Distribution of Positron Annihilation in the Galaxy 1992**
 Note
 August 28-September 9. Presented at COSPAR Symposium in Washington D.C. Contains conference program brochure and correspondence.
- box 27, folder 18 **High Energy Processes in Solar Flares 1992**
 Note
 October. With N. Mandzhavidze. Presented at the COMPTON Workshop in St. Louis. Contains paper typescripts.
- box 27, folder 19 **Astrophysical Gamma Ray Lines from Accelerated Particle Interactions 1993**
 Note
 January 25-February 4. Presented at the Conference on Gamma Ray Sky with COMPTON GRO and SIGMA in Paris, France. Contains paper typescripts and correspondence.
- box 28, folder 1 **Primary and Secondary Cosmic Ray Positrons and Electrons 1993**
 Note
 July 19-30. With J.G. Skibo. Presented at the XXIII International Cosmic Ray Conference in Calgary, Canada. Contains paper typescript and correspondence.
- box 28, folder 2 **Theoretical Models for High Energy Solar Flare Emissions and Trapping of Protons in Twisted Magnetic Loops 1993 - 1994**
 Note
 With N. Mandzhavidze and Yun-Tung Lau. Presented at Waterville Valley Workshop. Contains typescript.
- box 28, folder 3 **Astrophysical Gamma Ray Emission Lines 1994**
 Note
 May. With R.E. Lingenfelter. Presented at the Conference on the Analysis of Emission Lines at Space Telescope Science Institute. Contains paper typescript, figures, reprints of reference articles, notes, and negatives.

CONFERENCES

Conference Presentations

box 28, folder 4

Analysis and Implications of the Nuclear Line Emission from the Orion Complex 1995

Note

September 30. With B. Kozlovsky and R.E. Lingenfelter. Presented at the 17th Symposium on Relativistic Astrophysics and Cosmology. Contains reprint and paper typescript.

box 28, folder 5

LiBeB, Cosmic Rays, and Gamma-Ray Line Astronomy 1998

Note

December. With Elizabeth Vangioni-Flam, Michael Casse, and Keith Olive. Presented at conference held in Paris, France. Contains reprint and page proof.

Miscellaneous Materials

box 28, folder 6

Gamma Ray Astronomy after Cos-B - Symposium 1979

Note

May 17-23. Held in Erice, Italy. Contains correspondence and notes.

box 28, folder 7

High Energy Solar Physics - Workshop 1995

Note

Contains typescripts of papers contributed by Goddard Space Flight Center scientists.

box 28, folder 8

Solar Maximum Mission (SMM) - Workshop 1984 - 1985

Note

Part 1. Contains typescripts of submitted papers, manuscripts, and correspondence.

box 29, folder 1

Solar Maximum Mission (SMM) - Workshop 1984 - 1985

Note

Part 2. Contains typescripts of submitted papers with notes.

box 29, folder 2

Solar Maximum Mission (SMM) - Workshop 1984 - 1985

Note

Part 3. Contains correspondence and typescripts of submitted papers.

box 29, folder 3

Topical Conference on Solar and Interplanetary Physics 1977

Note

January 12-15. Tuscon, Arizona. Contains book of abstracts, correspondence, and notes. Book of abstracts includes two papers presented by Ramaty at the conference - "Narrow Lines from Alpha-Alpha Reactions" and "The Reflections of Hard X-Rays from the Photosphere."

box 29, folder 4

Miscellaneous conferences 1968 - 1997

Note

Contains conference broadsides, brochures, and correspondence.

COMMITTEES

NASA Committees

box 29, folder 5	<p>Gamma Ray Observatory (GRO) - Support Group 1977 - 1979</p> <p>Note</p> <p>Part 1. Contains correspondence, notes, typescripts of budget proposals, and lists of other committees and groups.</p>
box 29, folder 6	<p>Gamma Ray Observatory (GRO) - Support Group 1977 - 1979</p> <p>Note</p> <p>Part 2. Contains correspondence, typescript of presentation on the gamma ray observatory to the administrator, typescripts of proposals for a high energy gamma ray telescope and large-area high-resolution experiment for gamma-ray line astronomy, and a brochure "Gamma Ray Observatory: A New Window to the Universe."</p>
box 29, folder 7	<p>Gamma Ray Observatory (GRO) - Support Group 1977 - 1979</p> <p>Note</p> <p>Part 3. Contains typescript of gamma ray observatory science plan, typescripts of proposals for transient event monitor, high energy gamma ray telescope, gamma ray spectroscopy experiment, high-resolution/high sensitivity observations, notes, graphs, figures, and other typescripts.</p>
box 29, folder 8	<p>MAX '90 Science Study Committee 1984 - 1986</p> <p>Note</p> <p>Part 1. Contains typescripts of assessment of the NASA Solar Physics Program (1986) and report of the MAX '90 Science Study Committee, copies of viewgraphs from presentations to the MAX '90 Study Committee, notes, and correspondence.</p>
box 29, folder 9	<p>MAX '90 Science Study Committee 1984 - 1986</p> <p>Note</p> <p>Part 2. Contains a photocopy of viewgraphs of presentation on solar flares, typescripts of Solar Physics Science Plan, MAX '90 Ground Rules, meeting agenda, Solar Physics Plan, MAX '91 report, photocopy of viewgraphs from presentation on Solar Optical Telescope, notes, graphs, and correspondence.</p>
box 30, folder 1	<p>MAX '90 Science Study Committee 1984 - 1986</p> <p>Note</p> <p>Part 3. Contains draft of the report of the Panel on the Physics of the Sun, typescripts of contributed papers to the Scientific Objectives section of the MAX '91 report, proposal to the MAX '90 Study Group, recommendations of the MAX '90 Study Committee, typescripts, agenda for the MAX '90 Study Committee meeting, and correspondence.</p>
box 30, folder 2	<p>Solar Physics Working Group 1976 - 1978</p> <p>Note</p> <p>Part 1. Contains correspondence, minutes and agendas for Solar Physics Committee meetings, and typescripts of scientific overview for the Physical Science Committee meeting and brief summary of the solar maximum mission.</p>
box 30, folder 3	<p>Solar Physics Working Group 1976 - 1978</p> <p>Note</p> <p>Part 2. Contains correspondence, agendas and memorandums of Solar Physics Committee meetings, typescripts of proposals, scientific objectives, and interim report on planning for the solar maximum year, and notes.</p>

box 30, folder 4

Solar Physics Working Group 1976 - 1978**Note**

Part 3. Contains typescripts of reviews of progress in solar spacelab, proposals, CSAA Solar Physics Strategy Plan, requirements for instrument control and data handling, and possible solar-problem oriented programs, and a memorandum.

box 30, folder 5

Solar Physics Working Group 1976 - 1978**Note**

Part 4. Contains reprints of U.S. Program for the IMS and Space Sciences Laboratory document, typescripts of brief summary of the Solar Maximum Mission, final report for Hard X-Ray Imaging Instrument, and Solar Physics payloads for spacelab.

National Research Committees and Working Groups

box 30, folder 6

Astronomy Survey Committee 1979 - 1981**Note**

Part 1. Contains correspondence, typescripts of report on Very High Energy Gamma Ray Astronomy, Gamma Ray Astronomy Preliminary Report to the High Energy Astrophysics Panel, discussion for the high energy panel, Heamowg Resolution, and Astronomy Committee projects and ideas for the 1980s.

box 30, folder 7

Astronomy Survey Committee 1979 - 1981**Note**

Part 2. Contains correspondence, typescripts of papers contributed to the High Energy Astronomy panel, and notes.

box 31, folder 1

Astronomy Survey Committee 1979 - 1981**Note**

Part 3. Contains correspondence, notes, typescripts of AXAF Science Working Group report, draft of paper on Solar EUV, X-Ray, and Gamma Ray Astronomy, and draft of chapter prepared for the High Energy Astrophysics report and book "A Strategy for Space Astronomy and Astrophysics for the 1980s."

box 31, folder 2

Committee on Space Astronomy and Astrophysics (CSAA) 1974 - 1979**Note**

Part 1. Contains correspondence, and typescripts of the report of the Panel on Cosmic-Ray Astrophysics, draft of chapter on Isotope and UH Measurements, and draft of chapter on the Gamma Ray Astrophysics.

box 31, folder 3

Committee on Space Astronomy and Astrophysics (CSAA) 1974 - 1979**Note**

Part 2. Contains typescripts of drafts of scientific strategies for high energy spectra, electrons and positrons, antimatter, origin and propagation, cosmic ray experiments, observations of Jupiter and Uranus, and research on galactic and solar accelerated particles, manuscript, reprint of the Cosmic Ray Observatory report, and newspaper clippings.

box 31, folder 4

Committee on Space Astronomy and Astrophysics (CSAA) 1974 - 1979**Note**

Part 3. Contains correspondence and three drafts of the report of the Panel on Cosmic-Ray Astrophysics.

box 31, folder 5

Committee on Space Astronomy and Astrophysics (CSAA) 1974 - 1979**Note**

Part 4. Contains book "Report on Space Science 1975."

box 31, folder 6

Outlook for Space Working Group 1974 - 1975**Note**

Part 1. Contains manuscripts, drafts of chapters contributed to the Outlook for Space final report including on Physics of Solar Flares, Solar Physics, Death and Ashes of Massive Stars, Nature of Cosmic Rays, Theory of Solar Gamma Rays, and Challenge and Response, notes, and correspondence including group meetings agendas, summaries, and memorandums.

box 31, folder 7

Outlook for Space Working Group 1974 - 1975**Note**

Part 2. Contains typescripts of papers contributed to the Outlook for Space Final Report including on Solar-Terrestrial Influences, New Directions in Solar Activity Research, Solar Physics in the 1980s and Beyond, Establishment of Extraterrestrial Habitats, Statement in Support of Solar Maximum Mission, Nature of the Universe, Origin and Evolution of the Solar System, and Origin and Future of Life.

box 32, folder 1

Outlook for Space Working Group 1974 - 1975**Note**

Part 3. Contains typescripts of sections on Solar Terrestrial Relations, Solar Neutrons, and Quest for the Origin and Future of Life, reprint and photocopies of reference articles, typescript of the Report of the OSO-K/Solar Flare Mission Study group, newspaper clipping, and brochures on Physics in 1974 and Quasars, Pulsars, Black Holes and HEAO's.

box 32, folder 2

Outlook for Space Working Group 1974 - 1975**Note**

Part 4. Contains manuscripts, typescripts of sections on Death and Ashes of Massive Stars, Nature of Cosmic Rays, Solar System Astrophysics, Exobiology, and Man's Extraterrestrial Imperative, and viewgraphs of the presentation on outlook for space purpose of review.

box 32, folder 3

Outlook for Space Working Group 1974 - 1975**Note**

Part 5. Contains photocopy of manuscript, typescripts of contributed chapters including the Study of Comparative Magnetospheres, Research Capabilities of an Interstellar System, Predicting the Future of Astronomy and Astrophysics, Importance of Isotopic Composition of Iron in Cosmic Rays, typescript of notes on speakers on relativity, newspaper clippings, and correspondence.

box 32, folder 4

Outlook for Space Working Group 1974 - 1975**Note**

Part 6. Contains brochure "Scientific Uses of the Space Shuttle."

box 32, folder 5

Particle Acceleration Working Group 1976 - 1978**Note**

Contains typescripts including list of group participants, particle acceleration working group programatics, two drafts of the working group report, and Ramaty's paper on Gamma-Ray and High-Energy Neutron Diagnostics of Particle Acceleration in Solar Flares, agenda brochure for solar terrestrial physics workshop, typescript of memorandum and first meeting report of solar terrestrial physics workshop, and correspondence.

SUBJECT FILES

- box 32, folder 6 **American Astronomical Society 1979 - 1987**
Note
Part 1. Contains correspondence, newsletters, and memorandums.
- box 33, folder 1 **American Astronomical Society 1979 - 1987**
Note
Part 2. Contains correspondence, meeting minutes, and newsletters.
- box 33, folder 2 **American Astronomical Society 1979 - 1987**
Note
Part 3. Contains correspondence and newsletters.
- box 33, folder 3 **American Astronomical Society 1979 - 1987**
Note
Part 4. Contains members directory, calendar for 1984, typescripts of by-laws of the division for high energy astrophysics, results of referendum on head prize, and list of invited papers for High Energy Astrophysics Division meeting in January 1984, memorandums, correspondence, and notes.
- box 33, folder 4 **American Astronomical Society 1979 - 1987**
Note
Part 5. Contains brochures of the constitution and by-laws of the American Astronomical Society and Cosmic Ray News Bulletins and newsletters.
- box 33, folder 5 **Annihilation of Galactic Positrons - Gamma Ray Astronomy 1978 - 1980**
Note
Contains letters, manuscripts of papers, and graphs.
- box 33, folder 6 **Galactic Center Annihilation Radiation 1979 - 1983**
Note
Part 1. Contains manuscript of paper, notes, graphs, and correspondence.
- box 33, folder 7 **Galactic Center Annihilation Radiation 1979 - 1983**
Note
Part 2. Contains typescripts of John McKinley's paper on positrons in astronomy, notes, correspondence, and newspaper clippings.
- box 34, folder 1 **Galactic Center Annihilation Radiation 1979 - 1983**
Note
Part 3. Contains reprints.
- box 34, folder 2 **Galactic Center Annihilation Radiation 1979 - 1983**
Note
Part 4. Contains reprints.
- box 34, folder 3 **Gamma Ray Observatory (GRO) 1976 - 1979**
Note
Part 1. Contains typescripts of the review paper on Gamma Ray Astronomy Observatory and GRO scientific objectives, figures, overhead transparencies, notes, and manuscript.

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- box 34, folder 4 **Gamma Ray Observatory (GRO) 1976 - 1979**
Note
Part 2. Contains typescripts of the report on Gamma Ray Observatory Theoretical Considerations and Observational Status.
- box 34, folder 5 **Gamma Ray Observatory (GRO) 1976 - 1979**
Note
Part 3. Contains typescripts of contributed papers including "Energetic Particle Reactions with Matter" and "Highest Energy Particles in Universe", preprints of articles including "Baryon Symmetric Big-Bang Cosmology" (F.W. Stecker) and "Gamma-Ray Astronomy and the Origin of Cosmic Rays" (F.W. Stecker), brochure on Prospects for Nuclear Gamma-Ray Astronomy (D. Clayton), and correspondence.
- box 34, folder 6 **Gamma-Ray Spectroscopy and Solar Flares 1978 - 1980**
Note
Contains manuscripts, graphs, and correspondence.
- box 34, folder 7 **Gamma-Ray Spectroscopy Experiment (GRSE) 1980 - 1984**
Note
Part 1. Contains correspondence, memorandums, and typescripts of the report on Consequences of the Removal of the Gamma-Ray Spectroscopy Experiment from the Gamma-Ray Observatory.
- box 35, folder 1 **Gamma-Ray Spectroscopy Experiment (GRSE) 1980 - 1984**
Note
Part 2. Contains correspondence and drafts of the report on Consequences of the Removal Gamma-Ray Spectroscopy Experiment from Gamma-Ray Observatory and summary of subcommittee conclusions.
- box 35, folder 2 **Gamma-Ray Spectroscopy Experiment (GRSE) 1980 - 1984**
Note
Part 3. Contains correspondence, memorandums, and a photocopy of viewgraphs from OSSE guest investigator program briefing.
- box 35, folder 3 **Gamma-Ray Transient Explorer 1980 - 1983**
Note
Contains manuscript and typescript for High Energy Transient Explorer Proposal, brochure "Spectroscopy/Timing - Transient Mission in X-Ray Astronomy," and correspondence.
- box 35, folder 4 **Purple Mountain Observatory - Nanking, China 1987 - 1988**
Note
Contains correspondence, manuscripts, brochures, and reprints.
- box 35, folder 5 **Proposals to NASA's Astrophysics Theory Program 1984 - 1988**
Note
Part 1. Contains notes, typescripts of the proposal on High Energy Radiation, Particles and Plasmas in Astrophysics, and correspondence.
- box 35, folder 6 **Proposals to NASA's Astrophysics Theory Program 1984 - 1988**
Note
Part 2. Contains notes, typescripts of the proposal on Positrons and Their Radiation in Astrophysics, and correspondence.
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box 35, folder 7	Proposals to NASA's Astrophysics Theory Program 1984 - 1988 Note Part 3. Contains drafts of the Theoretical High-Energy Solar Physics proposal and renewal proposal to the National Aeronautic and Space Administration, photocopies of other scientific proposals and reference articles, and correspondence.
box 35, folder 8	Research and Technology Objectives and Plans (RTOP) 1976 - 1983 Note Part 1. Contains typescript of Solar Terrestrial Research and Technology Objectives and Plans proposals for fiscal year 1978.
box 35, folder 9	Research and Technology Objectives and Plans (RTOP) 1976 - 1983 Note Part 2. Contains notes, overhead transparencies, correspondence, and typescripts of scientific proposals.
box 36, folder 1	Research and Technology Objectives and Plans (RTOP) 1976 - 1983 Note Part 3. Contains correspondence, memorandums, and notes.
box 36, folder 2	Solar Flares 1962 - 1981 Note Part 1. Contains reprints and photocopies of reference articles.
box 36, folder 3	Solar Flares 1962 - 1981 Note Part 2. Contains reprints and photocopies of reference articles.
box 36, folder 4	Solar High-Energy Astrophysical Plasmas Explorer (SHAPE) 1985 - 1986 Note Part 1. Contains correspondence and typescripts of the explorer proposal.
box 36, folder 5	Solar High-Energy Astrophysical Plasmas Explorer (SHAPE) 1985 - 1986 Note Part 2. Contains brochures including volume 1 "Proposed Concept, Statement of Work, and Cost Plan" and volume 2 "Solar High-Energy Astrophysical Plasmas Explorer."
box 36, folder 6	Solar High-Energy Astrophysical Plasmas Explorer (SHAPE) 1985 - 1986 Note Part 3. Contains typescripts of the Solar High-Energy Astrophysical Plasmas Explorer proposal.
box 36, folder 7	Solar High-Energy Astrophysical Plasmas Explorer (SHAPE) 1985 - 1986 Note Part 4. Contains typescripts of the Solar High-Energy Astrophysical Explorer proposal, reprint of reference article, and photocopy of the Gamma-Ray Astronomy mission proposal.
box 36, folder 8	Solar High-Energy Astrophysical Plasmas Explorer (SHAPE) 1985 - 1986 Note Part 5. Contains brochures of MAX '91 study and research plans.

box 37, folder 1

Theoretical High Energy Astrophysics Office - NASA 1980 - 1996**Note**

Contains correspondence, typescripts of Ramaty's report on Highlights and Individual Achievements and Outlook on the Laboratory for High Energy Astrophysics, 5-year plan, and Robert Streitmatter's invited talk, Ramaty's applications for positions at the Laboratory for High Energy Astrophysics, and promotions and nominations reports.

box 37, folder 2

University Space Research Association - NASA 1989 - 1996**Note**

Contains correspondence.

CORRESPONDENCE

Chronological Files

box 37, folder 3

1963 0

box 37, folder 4

1964 0

box 37, folder 5

1965 0

box 37, folder 6

1966 0

box 37, folder 7

1967 0

box 37, folder 8

1968 0

box 37, folder 9

1969 0

box 38, folder 1

1970 0

box 38, folder 2

1971 0

box 38, folder 3

1972 0

box 38, folder 4

1973 0

box 38, folder 5

1974 0

box 38, folder 6

1975 0**Note**

January - June.

box 38, folder 7

1975 0**Note**

July - December.

box 38, folder 8

1976 0**Note**

January - August.

box 38, folder 9

1976 0**Note**

September - December.

box 39, folder 1

1977 0**Note**

January - May.

box 39, folder 2

1977 0**Note**

June - December.

box 39, folder 3

1978 0

CORRESPONDENCE
Chronological Files

box 39, folder 4	1979 0 Note January - June.
box 39, folder 5	1979 0 Note July - December.
box 39, folder 6 box 39, folder 7	1980 0 1981 0 Note January - June.
box 39, folder 8	1981 0 Note July - December.
box 39, folder 9	1982 0 Note January - April.
box 40, folder 1	1982 0 Note May - December.
box 40, folder 2	1983 0 Note January - May.
box 40, folder 3	1983 0 Note June - December.
box 40, folder 4	1984 0 Note January - April.
box 40, folder 5	1984 0 Note May - December.
box 40, folder 6	1985 0 Note January - April.
box 40, folder 7	1985 0 Note July - December.
box 40, folder 8 box 41, folder 1	1986 0 1987 0

box 41, folder 2	1988 0 Note January - June.
box 41, folder 3	1988 0 Note January - December.
box 41, folder 4	1989 0 Note January - June.
box 41, folder 5	1989 0 Note July - December.
box 41, folder 6	1990 0 Note January - June.
box 41, folder 7	1990 0 Note July - September.
box 42, folder 1	1990 0 Note October - December.
box 42, folder 2	1991 0 Note January - June.
box 42, folder 3	1991 0 Note July - December.
box 42, folder 4	1992 0 Note January - June.
box 42, folder 5	1992 0 Note July - December.
box 42, folder 6	1993 0 Note January - June.
box 42, folder 7	1993 0 Note July - December.
box 43, folder 1	1994 0

box 43, folder 2	1995 0 Note January - July.
box 43, folder 3	1995 0 Note August - December.
box 43, folder 4	1996 0 Note January - April.
box 43, folder 5	1996 0 Note May - October.
box 43, folder 6 box 43, folder 7	1997 0 1998 0 Note January - June.
box 43, folder 8	1998 0 Note July - December.
box 44, folder 1 box 44, folder 2	1999 0 Undated 0

Letters of Recommendations and Evaluations

box 44, folder 3	Letters of recommendations and evaluations 1969 - 1988 Access Information Restrictions Apply
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Undated Miscellaneous**BIOGRAPHICAL MATERIALS**

box 44, folder 4	Certificates 1966 - 1980 Note Contains photocopies of certificates of completion of graduate work, nomination of the degree of doctor of philosophy, John C. Lindsay memorial award for his work on the theory of gamma-ray repeaters, and NASA's award for the exceptional scientific achievement.
box 44, folder 5	Curriculum vitae 0 Note Contains typescripts of curriculum vitae and resumes.
box 44, folder 6	Research statements 0 Note Contains typescripts and manuscript.

box 44, folder 7

Performance evaluations 1976 - 1993

Note

Contains typescripts.

Access Information

Restrictions Apply

box 44, folder 8

Highlights of research presentation for research committee 0

Note

Contains typescripts.

box 44, folder 9

Encyclopedia article 1997

Note

Contains typescript of a biographical note for the encyclopedia Who's Who in America.

box 44, folder 10

Newspaper and newsletters clippings 1970

Note

Contains photocopies of newspaper articles referring to Ramaty's work.

box 44, folder 11

Group photographs with Reuven Ramaty 1990 - 1996

Note

Contains three photographs including one at Goddard Space Flight Center and another with participants at the Cosmic Ray Symposium in Durham, New Hampshire, 1996.