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F.G. Summers

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TECHNICAL MEMORANDUM

SCIENCE DIRECTORATE PUBLICATIONS AND PRESENTATIONS JANUARY 1–DECEMBER 31, 2003

NASA REPORTS AND OTHER PUBLICATIONS

Technical Memorandums

1. An Experimental Investigation To Determine Interaction Between Rotating Bodies, *NASA/TM–2003–212286*, February 2003. R.N. Grugel, K. Mazuruk, and M.P. Volz.
2. Science Directorate Publications and Presentations, January 1–December 31, 2002, *NASA/TM–2003–212635*, December 2003. Compiled by F.G. Summers.

Technical Publications

1. Gauging the Nearness and Size of Cycle Maximum, *NASA/TP–2003–212927*, November 2003. R.M. Wilson and D.H. Hathaway.

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1. 2002 NASA Materials Science Conference—Proceedings, *NASA/CP–2003–212339*, CD-ROM, 2003. N. Ramachandran.
2. 2002 NASA Materials Science Conference—Proceedings, *NASA/CP–2003–212339*, Abstract Book, D. McCauley and N. Bennett (eds.), 2003. D. Gillies, N. Ramachandran, and K. Murphy.
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67. Integrated Optical Design Analysis (IODA)—New Test Data and Modeling Features, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. J.D. Moore, E. Troy, and B. Patrick.
68. The Interaction Between an Insoluble Particle and an Advancing Solid/Liquid Interface: Micro-Gravity Experiments and Theoretical Developments, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. A.V. Catalina, S. Sen, and D.M. Stefanescu.
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70. Investigation of Carbon-Polymer Structures With Embedded Fiber-Optic Bragg Gratings, NASA/MSFC 2003 Propulsion Measurement Sensor Development Workshop, Huntsville, AL, May 13–15, 2003. J. Grant, R. Kaul, S. Taylor, G. Myers, and A. Sharma.
71. Investigation of the Surface Stress in SiC and Diamond Nanocrystals by In-Situ High Pressure Powder Diffraction Technique, Materials Research Society Spring Meeting, San Francisco, CA, April 21–25, 2003. B. Palosz, S. Stel'makh, S.E. Grzanka, S. Gierlotka, Y. Zhao, and W. Palosz.
72. Land Surface Temperature Retrievals From GOES-8 Using Emissivities Retrieved from MODIS, AMS Conference 83rd Annual Meeting of the American Meteorological Society, Long Beach, CA, February 9–13, 2003. R.J. Suggs, G.J. Jedlovec, W.M. Lapenta, and S.L. Haines.
73. Lessons Learned During Cryogenic Optical Testing of the Advanced Mirror Systems Demonstrators (AMSDs), Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. J.B. Hadaway, P. Reardon, J. Geray, B. Robinson, H.P. Stahl, R. Eng, and J. Kegley.
74. The Light of the Night Sky in EUSO Duty Cycle and Background, 28th International Cosmic Ray Conference, Tsukuba, Japan, July 31–August 7, 2003. J.H. Adams, Jr., C. Berat, D. Lebrun, and F. Montanet.

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75. Lightning and Precipitation: Observational Analysis of LIS and PR, European Geoscience, Fifth Plinius Conference, Mediterranean Storms, Ajaccio, Corsica, France, October 1–3, 2003. C. Adamo, R. Solomon, S.J. Goodman, S. Dietrich, and A. Mugnai.
76. Limited Angle Reconstruction Method for Reconstructing Terrestrial Plasmaspheric Densities, The Applied Information Systems Research Program (AISRP), University of Pittsburgh, PA, October 28–29, 2003. T.S. Newman, N. Santhanam, H. Zhang, and D.L. Gallagher.
77. Long Focal Length Large Mirror Fabrication System, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. H.E. Bennett.
78. Low Cost Precision Carbon-Carbon Mirrors and Telescope Structures for Exoatmospheric Interceptor Structures, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. G.D. Wonacott.
79. Macromolecular Expression and Function—A New Paradigm for NASA Risk Assessment, Biotechnology Research Seminar, The University of Alabama in Huntsville, Huntsville, AL, September 12, 2003. R.C. Richmond.
80. Macromolecular Topography Leaps Into the Digital Age, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. J. Lovelace, H. Bellamy, E.H. Snell, and G. Borgstahl.
81. Magnetic Microspheres and Tissue Model Studies for Therapeutical Applications, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. N. Ramachandran and K. Mazuruk.
82. Mapping the Ancient Maya Landscape From Space, Fifth World Archaeological Conference, Washington, DC, June 24–26, 2003. T.L. Sever.
83. Mathematical Inversion of Lightning Data: Techniques and Applications, University of Nevada, Las Vegas, NV, February 6, 2003. W.J. Koshak.
84. Measurement of Characteristics of Micron Size Individual Dust Particles of Astrophysical Interest, 10th Workshop on the Physics of Dusty Plasmas, St. Thomas, U.S. Virgin Islands, June 18–21, 2003. P.D. Craven, M.M. Abbas, D. Takosic, and J.F. Spann, Jr.
85. Microfossils in CI and CO Carbonaceous Meteorites, SPIE Conference on Instruments, Methods, and Missions for Astrobiology VII (AM121), San Diego, CA, August 3–8, 2003. R.B. Hoover, A.Y. Rozanov, G. Jerman, and J. Costen.

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86. Microfossils in the Murchison and Rainbow Carbonaceous Meteorites, SPIE Conference on Astronautical Telescopes and Instruments, Waikoloa, HI, August 22–28, 2002. R.B. Hoover, A.Y. Rozanov, G. Jerman, and P.C. Davies.
87. Modeling Tetragonal Lysozyme Crystal Growth Rates, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. S. Gorti, E.L. Forsythe, and M.L. Pusey.
88. Modified Laser Flash Method for Thermal Properties Measurements and the Influence of Heat Convection, International Mechanical Engineering Congress and Research and Development Exposition, Washington, DC, November 15–21, 2003. B. Lin, S. Zhu, H. Ban, C. Li, R.N. Scripa, C.-H. Su, and S.L. Lehoczky.
89. Multi-Satellite Observations of Oceanic Lightning, 12th International Conference on Atmospheric Electricity, Versailles, France, June 9–14, 2003. W.L. Boeck, A.R. Jacobson, H.J. Christian, and S.J. Goodman.
90. The Mundrabilla Meteorite in Three-Dimensions, National Museum of Natural History, Washington, DC, July 18, 2003. D.C. Gillies.
91. NASA Earth Science Research and Applications Using UAVs, Technical Analysis and Applications Center (TAAC) 2003 UAV Conference, Albuquerque, NM, October 28–30, 2003. A.R. Guillory.
92. NASA Marshall Engineering Thermosphere Model—Version 2.0 (MET-V2-0), 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. J.K. Owens and W.W. Vaughan.
93. NASA's Space Science Programming Possibilities for Planetaria, South Eastern Planetarium Association 2003, Baton Rouge, LA, June 16–20, 2003. M.L. Adams.
94. Neuregulin—First Steps Towards a Structure, American Crystallographic Association (ACA), Covington, KY, July 26–31, 2003. D.S. Ferree, C.C. Malone, and L.J. Karr.
95. The Nonlinear Coupling of Alfven and Lower Hybrid Waves in Space Plasma, The Fifth International Meeting on Nonlinear Waves and Chaos in Space Plasmas, Mumbai, India, March 2–7, 2003. G.V. Khazanov, N. Singh, and E.N. Krivorutsky.
96. The North Alabama Lightning Mapping Array: Recent Results and Future Prospects, International Conference on Atmospheric Electricity ICAE 2003, Versailles, France, June 9–14, 2003. S.J. Goodman, R.J. Blakeslee, H.J. Christian, W.J. Koshak, J.C. Bailey, J.M. Hall, E.W. McCaul, Jr., D.E. Buechler, W.A. Petersen, C. Darden, and T. Bradshaw.

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97. Numerical Calculation of the Morphology of a Solid/Liquid Interface Near an Insoluble Particle, International Conference of Modeling of Casting, Welding, and Advanced Solidification Processes X, Sandestin, FL, May 25–30, 2003. A.V. Catalina, D.M. Stefanescu, and S. Sen.
98. Observed Helicity of Active Regions in Solar Cycle 21, The Johns Hopkins University Applied Physics Laboratory, Columbia, MD, June 18, 2003. M.J. Hagyard, A.A. Pevtsov, Z. Blehm, and J.E. Smith.
99. On the Nature of the Eclipsing Bright X-Ray Source in the Circinus Galaxy Field, HEAD 2003—Seventh Meeting of the AAS High Energy Astrophysics Division, Mt. Tremblant, Quebec, Canada, March 23–26, 2003. M.C. Weisskopf, K. Wu, A.F. Tennant, and D.A. Swartz.
100. Optical Applications of Nano-Laminates, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. T.W. Barbee II.
101. Optics Needs for Future NASA Missions, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. H.P. Stahl.
102. Optimizing Crystal Growth Conditions for Delta-L: A Solubility Study of Insulin, Seminar for USRP Summer 2003 Program, Marshall Space Flight Center, Huntsville, AL, July 30, 2003. J.L. Baldridge.
103. Origin of Stability in Particle Sedimentation, Seminar at University of Maine, Orono, ME, April 25, 2003. P.N. Segre.
104. Origin of Stability in Sedimentation, Division of Fluid Dynamics 56th Annual Meeting, East Rutherford, NJ, September 23–25, 2003. P.N. Segre.
105. Particle Acceleration and Emission in Relativistic Jets, 28th International Cosmic Ray Conference, Tsukuba, Japan, July 31–August 7, 2003. K. Nishikawa, P.E. Hardee, G.A. Richardson, R.D. Preece, H. Sol, and G.J. Fishman.
106. Particle Acceleration and Emission in Relativistic Jets, Particle Acceleration in Astrophysical Objects, Kraków, Poland, June 24–28, 2003. K. Nishikawa, P.E. Hardee, G.A. Richardson, R.D. Preece, H. Sol, and G.J. Fishman.
107. Particle Acceleration and Radiation Associated With Magnetic Field Generation From Relativistic Collisionless Shocks, Gamma Ray Burst Symposium, Santa Fe, NM, September 8–12, 2003. K. Nishikawa, P.E. Hardee, G.A. Richardson, R.D. Preece, H. Sol, and G.J. Fishman.
108. Perfection of Apoferritin Crystals: An Advanced X-Ray Imaging and Diffraction Study, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. Z.W. Hu, B.R. Thomas, A.A. Chernov, Y.S. Chu, B. Lai, and Z. Cai.

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109. Perfectly Cold Crystals: What Happens When They Are X-Rayed? American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. M.J. van der Woerd, D.S. Ferree, and E.H. Snell.
110. Phase Sensitive X-Ray Diffraction Imaging Study of Protein Crystals, Advanced Photon Source Seminar, Argonne National Laboratory, Chicago, IL, June 30, 2003. Z.W. Hu.
111. Phase-Synchronized Modal Testing of Mirror Membrane, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. T. Rogers.
112. Plasma Sheath Behavior of the ProSEDS Delta II, 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Huntsville, AL, July 20–23, 2003. K.H. Wright, N.H. Stone, B.E. Gilchrist, J.R. Vaughn, and G.P. Garbe.
113. Pore Formation and Mobility Investigation (PFMI): Concept, Hardware Development, and Initial Analysis of Experiments Conducted Aboard the *International Space Station*, Invited Talk to University of Texas, Austin, TX, October 7, 2003. A. Cruz, K. Bors, H. Jansen, and R.C. Richmond.
114. Pore Formation and Mobility Investigation (PFMI): Description and Initial Analysis of Experiments Conducted Aboard the *International Space Station*, 15th American Conference on Crystal Growth and Epitaxy (ACCGE), Keystone, CO, July 20–24, 2003. R.N. Grugel, A.V. Anilkumar, and C.P. Lee.
115. Preliminary Optical and Electric Field Pulse Statistics From Storm Overflights During the Altus Cumulus Electrification Study, International Conference on Atmospheric Electricity ICAE 2003, Versailles, France, June 9–14, 2003. D.M. Mach, R.J. Blakeslee, J.C. Bailey, W.M. Farrell, R.A. Goldberg, M.D. Desch, and J.G. Houser.
116. Purification, Crystallization, and Preliminary X-Ray Analysis of Native Canvalin, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. M.L. Pusey, J. Dowell, J.A. Gavira-Gallardo, and J. Ng.
117. Radiation Dose-Effects on Cell Cycle, Apoptosis, and Marker Expression of Ataxia Telangiectasia-Heterozygous Human Breast Epithelial Cells, Fifth Annual Biological Sciences Retreat, Guntersville, AL, October 11, 2003. A. Cruz, K. Bors, H. Jansen, and R.C. Richmond.
118. Radiation Shielding for Manned Deep Space Missions, Radiation Safety for Manned Mission to Mars Conference, Dubna, Russia, September 28–October 2, 2003. J.H. Adams, Jr.
119. Relationships Between Electrical and Radar Characteristics of Thunderstorms Observed During ACES, International Conference on Atmospheric Electricity (ICAE) 2003, Versailles, France, June 9–14, 2003. D.E. Buechler, D.M. Mach, and R.J. Blakeslee.

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120. Residual Gases in Crystal Growth Systems, ECI Microgravity Transport Processes in Fluid, Thermal, Biological and Materials Sciences III, Davos, Switzerland, September 14–19, 2003. W. Palosz.
121. Residual Gases in Crystal Growth Systems: Their Origin, Magnitude and Dependence on the Processing Conditions, International Conference on Single Crystals, Obninsk, Russia, September 21–26, 2003. W. Palosz.
122. Ring Current Ion Coupling With Electromagnetic Ion Cyclotron Waves, Advanced Research Workshop on the Effects of Space Weather on Technology Infrastructure, Rhodes, Greece, March 23–30, 2003. G.V. Khazanov.
123. The Rondonia Lightning Detection Network: Network Description, Science Objectives, Data Processing/Archival Methodology, and Results, International Conference on Atmospheric Electricity ICAE 2003, Versailles, France, June 9–14, 2003. R.J. Blakeslee, J.C. Bailey, O. Pinto, A. Athayde, N. Renno, and C.D. Weidman.
124. Science Issues Associated With the Use of a Microfluidic Chip Designed Specifically for Protein Crystallization, American Crystallographic Association (ACA) Covington, KY, July 26–31, 2003. A.M. Holmes, L. Monaco, C. Barnes, S. Spearing, A. Jenkins, T. Johnson, D. Mayer, and H. Cole.
125. SLMS™ Athermal Technology for UV and Cryogenic Applications, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. W.A. Goodman and M. Jacoby.
126. Sol-Gel Precursors for Ceramics From Minerals Simulating Soils From the Moon and Mars, 105th Annual Meeting of the American Ceramic Society, Nashville, TN, April 27–30, 2003. L. Sibille, J.A. Gavira-Gallardo, and D. Hourlier-Bahloul.
127. Solutal Convection Around Growing Protein Crystal and Diffusional Purification in Space, International Symposium on Physical Sciences in Space (ISPS), Toronto, Canada, May 4–8, 2003. A.A. Chernov and C.P. Lee.
128. Space Station Science Supported by Marshall Space Flight Center, American Institute of Aeronautics and Astronautics (AIAA) Seminar, Session IV/Space Station (*ISS*) Operations Technology and Future Space Science Plans, Huntsville, AL, March 15, 2003. A.F. Whitaker, P.A. Curreri, and T.R. Smith.
129. Spaceflight Holography Investigation in a Virtual Apparatus (SHIVA) Ground Experiments and Concepts for Flight Design, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. J.H. Micruik, J.D. Trolinger, J.D. Lackey, M.E. Milton, J. Waggoner, and R.D. Pope.

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130. Stability Analysis of Flow Induced by the Traveling Magnetic Field, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. K. Mazuruk.
131. Status Report and Lessons Learned From the University of Arizona UA NGST Mirror System Demonstrator, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. D. Baiocchi, and J. Burge.
132. Structural Basis for “Flip-Flop” Action of Human Pyruvate Dehydrogenase, American Crystallographic Association (ACA) Meeting, Cincinnati, OH, July 26–31, 2003. E. Ciszak, L.G. Korotchkina, P.M. Dominiak, S. Sidhu, and M.S. Patel.
133. Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-Dependent Enzymes Revealed by Human Pyruvate Dehydrogenase, Polish Chemical Society Meeting, Lublin, Poland, September 15–19, 2003. P.M. Dominiak, E.M. Ciszak, L.G. Korotchkina, S. Sidhu, and M.S. Patel.
134. Structural Health Monitoring of Composite Materials Using Distributed Fiber Bragg Sensors, 2002 OSA Annual Meeting and Exhibit/LS-XVIII, Orlando, FL, September 29–October 3, 2002. J. Grant, R. Kual, S. Taylor, K.V. Jackson, G. Myers, Y. Wang, and A. Sharma.
135. Structural Model for the Flip-Flop Action in Thiamin Pyrophosphate—Dependent Human Pyruvate Dehydrogenase, Gordon Research Conference, Meriden, NH, July 13–18, 2003. E.M. Ciszak and P.M. Dominiak.
136. Structure-Derived Proton-Transfer Mechanism for Action of Human Pyruvate Dehydrogenase, University of Plymouth, United Kingdom, August 26, 2003. E.M. Ciszak and P.M. Dominiak.
137. SUBSA and PFMI Transparent Furnace Systems Currently in Use in the *International Space Station* Microgravity Science Glovebox, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. R.A. Spivey, S. Gilley, A. Ostrogorsky, R.N. Grugel, G. Smith, and P. Luz.
138. Synthesis of Sol-Gel Precursors for Ceramics From Lunar and Martian Soil Simulants, 55th Pacific Coast Regional and Basic Science Division Fall Meeting, Oakland, CA, October 19–22, 2003. L. Sibille, J.A. Gavira-Gallardo, and D. Hourlier-Bahloul.
139. A Tabletop Tool for Modeling Life Support Systems, Conference on Space Technologies, Colorado Springs, CO, November 4–6, 2003. N. Ramachandran, A. Majumdar, D. McDaniels, and E. Stewart.

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140. Thermal Property Measurement of Semiconductor Melt Using Modified Laser Flash Method, American Society of Mechanical Engineers, Las Vegas, NV, July 21–23, 2003. B. Lin, S. Zhu, H. Ban, C. Li, R.N. Scripa, C.-H. Su, and S.L. Lehoczky.
141. Through Microgravity and Towards the Stars: Microgravity and Strategic Research at Marshall's Biological and Physical Space Research Laboratory, Gordon Research Conference, New London, CT, July 26–August 1, 2003. P.A. Curreri.
142. A Total Lightning Climatology for the Tennessee Valley Region, International Conference on Atmospheric Electricity (ICAE) 2003, Versailles, France, June 9–14, 2003. E.W. McCaul, Jr., S.J. Goodman, D.E. Buechler, R.J. Blakeslee, H.J. Christian, D.J. Boccippio, W.J. Koshak, J.C. Bailey, J.M. Hall, M. Bateman, W.A. Petersen, C. Darden, and T. Bradshaw.
143. Towards the Structure Determination of a Modulated Protein Crystal: The Semicrystalline State of Profilin: Actin, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. G. Borgstahl, J. Lovelace, E.H. Snell, and H. Bellamy.
144. Traveling Magnetic Field Applications for Vertical Bridgman Growth: Modeling and Experiment, 15th American Conference on Crystal Growth and Epitaxy (ACCGE), Keystone, CO, July 20–24, 2003. K. Mazuruk.
145. Two Strategies for Microbial Production of an Industrial Enzyme—Alpha-Amylase, Poster Presentation at Student Research Day, The University of Alabama in Huntsville, Huntsville, AL, April 11, 2003. E.C.M.J. Bernhardsdotter, O.K. Garriott, M.L. Pusey, and J.D. Ng.
146. UAH Instrument for Measuring Cryo CTE, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. C.S. Vikram and J.B. Hadaway.
147. Ultra-Lightweight Borosilicate Gas-Fusion Mirror for Cryogenic Testing, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. M. Voevodsky.
148. Use of MODIS Land and Sea Surface Temperatures To Initialize Mesoscale Models, AMS Conference 83rd Annual Meeting of the American Meteorological Society, Long Beach, CA, February, 9–13, 2003. W.M. Lapenta, S. Haines, G.J. Jedlovec, and S. Mackaro.
149. Use of MODIS/AIRS Direct Broadcast Data for Short Term Weather Forecasting, EOS Direct Broadcast Users Conference, Kohala Coast, HI, November 17–20, 2003. G.J. Jedlovec.
150. Use of Satellite Data Assimilation To Infer Land Surface Thermal Inertia, AMS Conference 83rd Annual Meeting of the American Meteorological Society, Long Beach, CA, February, 9–13, 2003. W.M. Lapenta, R.T. McNider, A. Biazar, R.J. Suggs, G.J. Jedlovec, and S. Dembek.

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151. Using Strong Magnetic Fields To Control Solutal Convection, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. N. Ramachandran and F.W. Leslie.
152. Using the Chandra Project To Communicate With Underdeveloped Constituencies, Meeting on Communicating Astronomy to the Public, Washington, DC, October 1–3, 2003. M.L. Adams, R.F. Elsner, C. Kouveliotou, S.K. Patel, R.D. Preece, C. Strong, C.A. Wilson, and P.M. Woods.
153. When Earth Songs Filled the Void of Space, Annual Meeting of the Tennessee Association of American Physics Teachers, Clarksville, TN, March 28, 2003. D.L. Gallagher.
154. Wide-Angle Optical Telescope for the EUSO Experiments, 28th International Cosmic Ray Conference, Tsukuba, Japan, July 31–August 7, 2003. L.W. Killman, Y. Takahashi, A. Zuccaro, D. Lamb, K. Pitalo, A. Lopada, and A. Keys.

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