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Origins of Cosmic Rays: Resolving Hess' Century-Old Puzzle (E18)

FIRST MEASUREMENTS OF THE ISOTOPIC COMPOSITION OF THE ULTRA-HEAVY GALACTIC COSMIC RAY NUCLEI CU, ZN, GA, AND GE FROM THE CRIS EXPERIMENT ON THE ACE SATELLITE

Walter Binns, wrb@wuphys.wustl.edu
Washington University in St. Louis, St. Louis, MO, Missouri, United States
Eric Christian, eric.r.christian@nasa.gov
NASA/Goddard Space Flight Center, Greenbelt, United States
A. C. Cummings, ace@srl.caltech.edu
California Institute of Technology, Pasadena, California, United States
Gerogia De Nolfo, georgia@cosmicra.gsfc.nasa.gov
NASA Goddard Space Flight Center, Greenbelt, Maryland, United States
Martin Israel, mhi@wuphys.wustl.edu
Washington University in St. Louis, St. Louis, Missouri, United States
Richard Leske, ral@srl.caltech.edu
California Institute of Technology, Pasadena, California, United States
R. A. Mewaldt, rmewaldt@srl.caltech.edu
California Institute of Technology, Pasadena, California, United States
Tycho Von Rosenvinge, tycho@milkyway.gsfc.nasa.gov
NASA Goddard Space Flight Center, Greenbelt, Maryland, United States
E. C. Stone, ecs@srl.caltech.edu
California Institute of Technology, Pasadena, California, United States
Mark Wiedenbeck, mark.e.wiedenbeck@jpl.nasa.gov
Jet Propulsion Laboratory, Pasadena, California, United States

The Cosmic Ray Isotope Spectrometer (CRIS) instrument on the Advanced Composition Explorer (ACE) satellite was launched in August, 1997 and has collected excellent data over this 12+ year period of time. The instrument has a geometrical factor that is 50 times larger than that of any previous isotope spectrometer. This large geometrical factor, combined with the very long exposure time, has enabled us to measure the cosmic ray isotopic abundances of Cu ($Z=29$), Zn ($Z=30$), Ga ($Z=31$), and Ge ($Z=32$) for the first time. In addition, we have measured the elemental abundances of the more abundant ultra-heavy nuclei up to Sr ($Z=38$). We have collected a total of 650 nuclei heavier than Ni ($Z=28$) with energies in the range of 150 to 600 MeV/nucleon. In this paper we report the isotopic measurements and compare the derived source abundances with that expected for an OB association origin of GCRs and with Solar System abundances.

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