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Accelerator Mass Spectrometry Search for Strangelets in Lunar Soil KE HAN, ALEXEI CHIKANIAN, EVAN FINCH, Yale University, RICHARD MAJKA, JACK SANDWEISS, JEFFREY ASHENFELTER, ANDREAS HEINZ, PETER PARKER, Yale University, PETER FISHER, BENJAMIN MONREAL, M. I. T., JES MADSEN, University of Aarhus, Denmark — The theoretical existence of Strange Quark Matter (SQM) with similar amounts of up, down and strange quarks in one single hadronic bag has been postulated for over two decades. A wide range of experimental searches for strangelets (small lumps of SQM with baryon number less than 10^6) have been conducted. However, none of these experiments, including terrestrial searches, accelerator searches, and the Alpha Magnetic Spectrometer 01 experiment (AMS-01) could give a definite answer to their existence. Our experiment searches for strangelets in lunar soil. Cosmic ray flux deposits strangelets on the Moon with a predicted concentration (one strange oxygen per 10^{16} to 10^{17} normal oxygen atoms) of 10^5 times higher than that on Earth. The lunar soil sample is analyzed using accelerator mass spectrometry through the tandem Van-de-Graaff accelerator at Yale University. The accelerator together with our own designed detection system enables us to identify strangelets at a level of less than 1 per 10^{17} atoms.

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