

HELIOPHYSICS AND LUNAR SCIENCE GOALS OF NASA'S COSMIC RAY TELESCOPE FOR THE EFFECTS OF RADIATION ABOARD THE LUNAR RECONNAISSANCE ORBITER. H. E. Spence¹; ¹ Center for Space Physics, Boston University 725 Commonwealth Avenue, Boston, MA.

Introduction: We provide an overview of the Cosmic Ray Telescope for the Effects of Radiation (CRaTER) instrument, part of the Lunar Reconnaissance Orbiter (LRO) science payload. LRO is the first mission in the NASA Robotic Lunar Exploration Program with a launch planned in late 2008. LRO mission objectives include finding safe landing sites, locating potential resources, and characterizing the radiation environment, three top priorities needed for future exploration of the Moon and Mars. The primary CRaTER science goal is to characterize, in the lunar environment, the biological consequences of galactic cosmic rays and solar energetic particles. CRaTER comprises a two-ended solid-state detector (SSD) telescope with one view to deep space and the other towards the lunar surface. Our primary heliophysics measurement is the linear energy transfer spectrum of particles greater than 10 MeV per nucleon, measured by six SSDs surrounding and between plastic with properties similar to human tissue. These primary observations constrain radiation transport models and contribute ultimately to assessing the biological consequences of the lunar radiation environment. Lunar science is provided by the nadir field-of-view, which has the capability to measure and map cosmic ray albedo in a manner that could provide new insights on lunar surface properties. We outline primary and secondary CRaTER measurement capabilities and outline their contributions to heliophysics and lunar science at the Moon.