DUST RINGS FROM PHOBOS AND DEIMOS? Jared R. Espley[1], Claudia Knez[2], Doug P. Hamilton[2], Jack E. P. Connerney[1], [1]Solar System Exploration Division, Code 695.0, Goddard Space Flight Center, Greenbelt, MD 20771 (Jared.Espley@gsfc.nasa.gov), [2]Astronomy Dept., University of Maryland – College Park, College Park, MD 20740.

Phobos and Deimos have long been suspected of creating rings of dusty debris around Mars. Soter [1] first predicted that such rings should exist and numerous theoretical studies have been published since then. Several attempts have been made to directly detect the rings but none have been successful. Additionally, observations from the plasma instruments onboard the Phobos-2 spacecraft have been controversially attributed to Martian rings. We describe proposals to directly observe the rings using the Spitzer Space Telescope, Hubble Space Telescope, the Mars Climate Sounder, and ground based telescopes. We also discuss the possibilities for indirectly detecting them using data from the magnetometer (MAG/ER) onboard Mars Global Surveyor (MGS).

The basic mechanism for the origin of the putative rings is the impact of the moons by high speed interplanetary material which then lofts dust into orbit around Mars. Dynamical forces then distribute the dust into circumplanetary rings or tori. Similar dusty rings have been found to be produced by small satellites at Jupiter, Saturn, Uranus, and Neptune (cf. [2] for a recent review).

Krivov and Hamilton [3] give the most recent comprehensive description of the theoretical expectations for the rings. They find that the Deimos ring might be more accurately called a torus with a height of about 7000 km and a width of 50,000 km. The Phobos ring is expected to be much thinner (about 400 km) and only extend to a maximum of about 30,000 km. See Figure 1.

References: [1] Soter, S. (1971), Cornell Center for Radiophysics and Space Research Report 462. [2] Sicardy, B. (2005), *Space Science Reviews, 116,* 457-470. [4] Krivov, A. V., and D. P. Hamilton, (1997), *Icarus, 128,* 335–353. [3] Hamilton, D. P. (1996), *Icarus, 119*, 153–172. [4] Krivov, A. V., A. G. Feofilov, and V. V. Dikarev (2006), *Planet. Space Sci., 54,* 871-878.

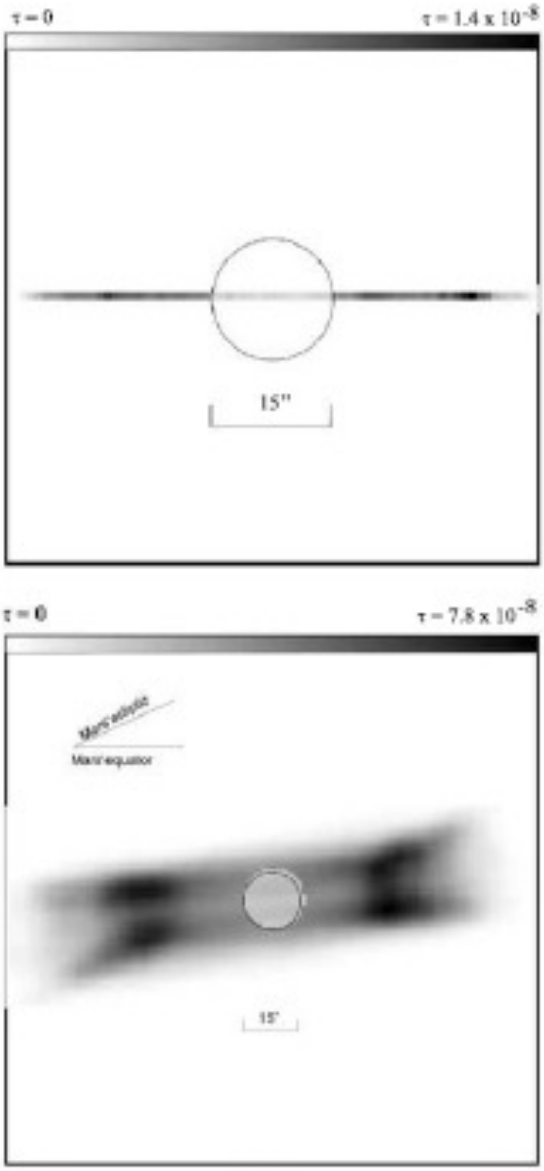

Figure 1 Distribution of optical fluxes from the Phobos ring (top) and the Deimos torus (bottom) as seen from Earth in December 2007. Adapted from [4].