

MONTE CARLO SIMULATIONS OF THE RESPONSE OF THE MARIE INSTRUMENT. V. Andersen, K. Lee, L. Pinsky, *Department of Physics, University of Houston, USA, (andersen@shasta.phys.uh.edu)*, W. Atwell, *Boeing Co.*, T. Cleghorn, F. Cucinotta, P. Saganti, *NASA-JSC*, R. Turner, *ANSER*, C. Zeitlin, *NSBRI*.

The MARIE instrument aboard Mars Odyssey functions as a “telescope” for the detection of charged, energetic, nuclei. The directionality that leads to the telescope description is achieved by requiring coincident signals in two designated detectors in MARIE’s silicon detector stack for the instrument to trigger. Because of this, MARIE is actually a bi-directional telescope. Triggering particles can enter the detector stack by passing through the lightly shielded “front” of the instrument, but can also enter the “back” of the instrument by passing through the bulk of Odyssey. Because of this, understanding how to relate the signals recorded by MARIE to astrophysically important quantities such as particle fluxes or spectra exterior to the spacecraft clearly requires detailed modeling of the physical interactions that occur as the particles pass through the spacecraft and the instrument itself.

In order to facilitate in the calibration of the MARIE data, we have begun a program to simulate the response of MARIE using the FLUKA [1] [2] Monte Carlo radiation transport code. FLUKA is ideal for treating the radiation transport problem for MARIE since it includes detailed treatments of hadron-nucleus

interactions, electromagnetic interactions, ionization energy loss, and is currently being upgraded to treat nucleus-nucleus interactions.

We present here preliminary simulations of the response of MARIE to forward moving protons.

References

- [1] A.Fasso, A.Ferrari, J.Ranft, P.R.Sala, *FLUKA: Status and Prospective for Hadronic Applications*, Proceedings of the Monte Carlo 2000 Conference, Lisbon, October 23-26 2000, A.Kling, F.Barao, M.Nakagawa, L.Tavora, P.Vaz - eds. , Springer-Verlag Berlin, p.955-960 (2001).
- [2] A.Fasso, A.Ferrari, P.R.Sala, *Electron-photon transport in FLUKA: status*, Proceedings of the Monte Carlo 2000 Conference, Lisbon, October 23-26 2000, A.Kling, F.Barao, M.Nakagawa, L.Tavora, P.Vaz - eds., Springer-Verlag Berlin, p.159-164 (2001).