Time reversed test particle calculations at Titan, based on CAPS-IMS measurements

Zsofia Bebesi (1), Geza Erdos (1), Karoly Szego (1), and David T. Young (2)

(1) Wigner Research Centre for Physics, Hungarian Academy of Sciences, Space physics and space technology, Budapest, Hungary (bebesi.zsofia@wigner.mta.hu), (2) Southwest Research Institute, San Antonio, Texas, USA

We used the theoretical approach of Kobel and Flückiger (1994) to construct a magnetic environment model in the vicinity of Titan - with the exception of placing the bow shock (which is not present at Titan) into infinity. The model has 4 free parameters to calibrate the shape and orientation of the field. We investigate the CAPS-IMS Singles data to calculate/estimate the location of origin of the detected cold ions at Titan, and we also use the measurements of the onboard Magnetometer to set the parameters of the model magnetic field. A 4th order Runge-Kutta method is applied to calculate the test particle trajectories in a time reversed scenario, in the curved magnetic environment. Several different ion species can be tracked by the model along their possible trajectories, as a first approach we considered three particle groups (1, 2 and 16 amu ions). In this initial study we show the results for some thoroughly discussed flybys like TA, TB and T5, but we consider more recent tailside encounters as well.

Reference:

Kobel, E. and E.O. Flückiger, A model of the steady state magnetic field in the magnetosheath, JGR 99, Issue A12, 23617, 1994