



Multifrequency Electromagnetic Sounding of the Galilean Satellites' Interiors

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The presence of conductive layers in the interiors of the four Galilean satellites Io, Europa, Ganymede and Callisto leads to induced magnetic fields triggered by the temporal variation of the Jovian magnetospheric field along the moons' orbits. The measured induced fields depend on the amplitude and frequency of the varying exciting field, the thickness and conductivity of the subsurface layers and on the flyby geometry of each measurement. By considering three different contributions to the Jovian magnetospheric field we determine different exciting frequencies and the corresponding amplitudes. Our model combines the internal field of Jupiter, the field of the Jovian plasma sheet and the field caused by currents flowing in the magnetopause boundary. We apply an electromagnetic induction model for a layered sphere and test different multilayer interior models for all moons. We then analyze the strength of the measurable induced field outside the moon. Finally we discuss suitable flyby parameters for future missions that could help to improve our knowledge about the moons' interiors.