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Changes in the Rotational Beaming Curve of Jupiter's Synchrotron Emission

M. J. Klein, S. J. Bolton, S. Gulkis and S. M. Levin

Jet Propulsion Laboratory
California Institute of Technology
Pasadena California 91109

Remote observations of the flux density and polarization of Jupiter's microwave emission provide useful data to test and constrain computational models of synchrotron radio emission from the inner regions of the Jovian magnetosphere. The focus of this paper is variability in the shape of Jupiter's rotational beamed emission, commonly known as the "beaming curve", that describes the observed flux density as a function of System III longitude. The paper includes results from a new study of the dependence of the beaming curve shape with the parameter D_E, the declination of the earth relative to Jupiter's rotational equator. The data base is the NASA-JPL Jupiter Patrol, a long-term radio astronomy monitoring program that began in 1971 and continues to produce total-intensity flux density observations in the 13 cm band. While the history of Jupiter's beaming curve exhibits remarkable stability and repeatability as a function of D_E, there may be evidence for short term departures from the nominal curves. Data supporting this tentative conclusion are presented. Preliminary results of a study comparing the observations and computer simulations of the synchrotron beaming curve will also be presented and discussed (see companion paper, "Modeling Jupiter's Synchrotron Emission", by Bolton et. al.).

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