

Origin of Io-related Jovian decametric radiation: an interpretation based on 3-D ray tracing analyses

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We have made 3-D ray tracing analyses to investigate the generation and propagation processes of Io-related Jovian decametric radiation (Io-DAM) by using several magnetic field and electron density models representing the Jovian ionosphere and magnetosphere. It is shown that the R-X mode wave, which is radiated almost perpendicularly to the local magnetic field from the northern polar region, is selected as a preferable Io-DAM wave based on the observed characteristics of the occurrence probability and polarization. As the required conditions for the origin of the R-X mode Io-DAM wave, it is necessary that the electron density in and near the source regions is quite low, and there are energy supply processes selective for the Jovian longitude in the Io-related northern source regions.