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## Modelling the electron density distribution in the Io Plasma Torus using Juno radio occultations

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The innermost galileian moon Io hosts an intense volcanic activity, which ejects about  $10^3$  kg/s of gas into Jupiter's magnetosphere. Here these neutrals are ionized by interaction with the background plasma and they are accelerated from keplerian velocity to corotation velocity thanks to Alfvén's theorem. This plasma cloud around the planet (the so-called Io Plasma Torus or IPT) slowly diffuses across Jupiter's magnetic field, but high electron densities ( $>1000$ - $2000$  cm<sup>-3</sup>) are found between 5-8  $R_J$ .

Juno is travelling along highly eccentric, polar orbits around the planet and flies very close to Jupiter's surface during each perijove. Thus, the radio links used for ground communication and radio science cross the IPT both in the uplink and the downlink leg. Being a dispersive medium, the torus introduces a different path delay on the X/X and Ka/Ka links established between the Ground Station and the spacecraft. Thus, the path delay can be extracted through a linear combination of the two links, and then quantitatively analyzed and fitted to different parametric models of the IPT.

In this work we have used almost all the available Juno radio occultations of the IPT in order to improve an already existing model by introducing both longitudinal and temporal variations of the electron density. To this end, we looked for the 2D Fourier expansion in longitude and time of the parameters of this model with the goal of minimizing the residuals of the fit and pointing out periodicities in the morphology of the torus.