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Simulation of Io's auroral emission in Eclipse

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Jupiter's moon Io is embedded in a dense plasma environment that triggers auroral emission in the moon's atmosphere. With a three-dimensional two-fluid plasma model we simulate the plasma interaction of Io and the auroral emission, which is generated around Io.
During the Jupiter flyby of the New Horizons spacecraft in February 2007 Io's aurora has been observed by the on board long-range visible-spectrum camera (LORRI) and simultaneously by the Hubble Space Telescope. By comparison of the observed emission with our simulated emission pattern we derive constraints for the distribution and density of Io's atmosphere. The observations revealed a complex emission pattern, where local volcanic plumes appear in the ultraviolet and visible radiation. In particular at the Tvasthar region close to the North pole a huge plume is cleary visible. With our simulation results we constrain the extension and column density of the large Tvashtar plume.