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Wave-particle interaction in the Io flux tube

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Observations by the JUNO spacecraft revealed energetic, bidirectional particle populations with broadband energy distributions in the high-latitude region of Jupiter. These measurements indicate that an acceleration mechanism of stochastic nature plays a dominant role for the generation of the intense main auroral oval. In our current work, we investigate the heating of an energetic upward proton population recently observed by JUNO in the Io flux tube wake near Jupiter. We try to infer on the relevant physical acceleration process by considering a resonant as well as a non-resonant wave-particle interaction mechanism, both based on Alfvén waves. We focus on necessary temporal scales to drive these mechanisms efficiently and also on the released wave energy by means of the transported Poynting flux along the flux tube.