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Jovian S-bursts generation by Alfvén waves

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Jupiter's radio emissions are dominated in intensity by decametric radio emissions due to the Io-Jupiter interaction. Previous analyses suggest that these emissions are cyclotron-maser emissions in the flux tubes connecting Io or Io's wake to Jupiter. Electrons responsible for the emission are thought to be accelerated from Io to Jupiter. Near Jupiter, a loss cone appears in the magnetically mirrored electron population, which is able to amplify extraordinary (X) mode radio waves. We present simulations of this hot electron population and of the cyclotron waves that they may destabilise through the maser instability. We assume the presence of kinetic Alfvén waves in the Io flux tube. Outside of limited acceleration regions where parallel electric field associated with Alfvén waves exists, the electrons are supposed to have an adiabatic motion along the magnetic field lines. The X-mode growth rate is computed, which allows us to build theoretical dynamic spectra of the resulting Jovian radio emissions, whose characteristics match those observed for Jovian S-bursts.