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Jovian non-Io decametric arcs: Occurrence periodicity of System III + 1.5%

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Abstract

The data recorded by STEREO/WAVES, Wind/WAVES and Cassini/RPWS instruments in a frequency range from few kHz up to ~ 16 MHz have been analyzed. Being mainly dedicated for measuring solar radio bursts (STEREO/WAVES, Wind/WAVES), Earth's (Wind/WAVES) and Saturn's (Cassini/RPWS) radio emissions the experiments also provided a big amount of observations of the Jovian decametric (DAM) as well as hectometric (HOM) radiation. The non-Io-related component of the DAM, which is the subject of our study, appears mainly in a form of arcs in time-frequency coordinates and generally is modulated by the Jovian ~9.925 - hour rotation period (System III). Nevertheless, analyzing the frequency-time dynamic spectra of Jovian radio emission taken by STEREO/ WAVES we have found several unusual events when non-Io related arcs recurred with a period of ~10.08 hour which is ~1.5% longer than the System III (9.925 hour) and shorter than period of System IV (System III + 3%). The same structures have also been detected in Wind and Cassini data. The possible relation between Io plasma torus, which rotates at the System IV period, and ~10.08-hour periodic arcs discovered in the dynamic spectra of the DAM is discussed.