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Variations of Synchrotron Radio Emissions from Jupiter's Inner Radiation Belt

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We describe the basic phenommenology of quasi-periodic 40 minute (QP-40) polar burst activities of Jupiter and their close correlation with the solar wind speed variations at the Jovian magnetosphere.

Physically, relativistic electrons of QP-40 bursts most likely come from the circumpolar regions of the inner radiation belt (IRB) which gives off intense synchroton radio emissions in a wide wavelength range.

Such relativistic electron bursts also give rise to beamed low-frequency radio bursts along polar magnetic field lines with distinct polarizations from Jupiter's two polar regions.

Jovian aurora activities are expected to be also affected by such QP-40 burst activities.

We present evidence of short-term (typical timescales shorter than an hour) variabilities of the IRB at 6cm wavelength and describe recent joint radio telescope observation campaign to monitor Jupiter in coordination with JUNO spacecraft.

Except for low-frequency polarization features, we anticipate JUNO to detect QP-40 activities from both polar regions during the arrival of high-speed solar wind with intermittency.

References

1. Y.–Q. Lou, The Astrophysical Journal, 548, 460 (2001).
2. Y.–Q. Lou, and C. Zheng, Mon. Not. Roy. Astron. Soc. Letters, 344, L1 (2003).
3. Y.–Q. Lou, H. G. Song, Y.Y. Liu, and M. Yang, Mon. Not. Roy. Astron. Soc. Letters, 421, L62 (2012).
4. Y.–Q. Lou, Geophysical Research Letters, 23, 609 (1996).
5. Y.–Q. Lou, Journal of Geophysical Research, 99, 14747 (1994).
6. G. R. Gladstone, et al., Nature, 415, 1000 (2002).