

Analyzing GMRT Data in Search of Exomoon Radio Emissions

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Abstract

Exoplanetary research has undergone a great deal of development and growth. Achievements in theoretical studies and detection techniques have led to the discovery of 3,900+ exoplanets in ~3,000 planetary systems to date. Despite this great success, and though candidates have been proposed, the confirmation of the first exomoon is yet to be accomplished. Motivated by this we've applied a novel radio-detection method, proposed by [1,2] based on a planet-moon interaction observed between the Jupiter-Io system. We analyze 325MHz observations of 3 nearby (~4.6 pc) planetary systems performed through the Giant Metrewave Radio Telescope (GMRT); located in Pune, India. We aim to utilize Io-controlled decametric radio emissions to determine how the presence of exomoons around giant planets might be revealed by the same modulation mechanism. Radio emissions from these interactions are then analyzed with the goal of extrapolating physical properties of planet-moon systems. Details of our data analysis are presented and discussed along with preliminary results.

References

- [1] Noyola, J.P., Satyal, S., and Musielak, Z.E.: Detection of Exomoons through Observation of Radio Emissions, *Astrophysical Journal*, Vol. 791, pp. 25-30, 2014.
- [2] Noyola, J.P., Satyal, S., and Musielak, Z.E.: On the Radio Detection of Multiple-Exomoon Systems due to Plasma Torus Sharing, *Astrophysical Journal*, Vol. 821, p.97, 2016.