

P4.4015 Dynamical frequency modulation as a signature of cyclotron emission of a transiting object in radio signal from its host star

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See full abstract here:

<http://ocs.ciemat.es/EPS2019ABS/pdf/P4.4015.pdf>

We present modelling a dynamical spectrum of a host star's cyclotron emission which came through a magnetically active (auroral) region of a planetary magnetosphere. The model for the local planetary emission is based on a horseshoe-type cyclotron instability [1,2]. A full electromagnetic modelling of a signal which propagated through the instability in the local magnetosphere is done. We use 1D geometrical setting but 3D fields in our model to account for initial circular polarization in the star's radio emission since it is characteristic for cyclotron maser radiation. The resultant frequency time dependence (dynamical spectrum) has a periodic modulated character. We suggest that seeing such dynamical spectrum can be an indication of a dipole magnetic field present at the planet, and compare to available observational results.

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[1] I. Vorgul, B.J. Kellett, R.A. Cairns, R. Bingham, K. Ronald, D.C. Speirs, S.L. McConville, K.M. Gillespie and A.D.R. Phelps, 'Cyclotron maser emission: Stars, planets and laboratory', *Physics of Plasmas*. 18, 5, (2011)

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