

## Probing star-planet interaction in Proxima Centauri with radio observations.

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### Abstract

Recent MHD 3D modelling of the Proxima system predicts that the interaction of the planet Proxima b with its host star, Proxima, would be proceeding in the supra-Alfvénic regime. In this case, no radio emission from the star-planet interaction should be observed.

In [this poster](#), we present multi-epoch radio observations of the Proxima Centauri system obtained with the Australia Telescope Compact Array (ATCA) in 2017 and 2021, at frequencies between from 1 to 3 GHz.

We also present a relatively simple modelling, which indicates that Proxima b is in the sub-Alfvénic regime, and therefore can induce radio emission from the interaction with its host star.

We find that the radio emission is highly circularly polarized in many epochs, with the maxima of emission happening at about twice per orbital period of Proxima b. The radio emission is consistent with being produced by the electron-cyclotron maser emission mechanism, and we suggest it is originated as a consequence of the interaction between Proxima b and its host star, Proxima. If confirmed, this result would validate the use of radio observations to detect new exoplanets. In addition, this would contradict the predictions from some 3D MHD modelling. This could in turn suggest that some of the stellar wind parameters in the region where Proxima b is located may need to be revised.