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Theoretical investigation of radio waves from planets around pulsars

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Four planets are known to orbit around pulsars. They have been detected through the method of pulsar timing. Some others, not yet detected, may exist. They might be found through an other method of detection, especially if our line of sight does not cross the pulsar's radio beam.

We investigate, through a theoretical analysis, if planets around pulsars could behave as radio sources, detectable with a next generation of radio telescopes.

The analysis is based on the theory of Alfvén wings: for a planet immersed in a pulsar's wind, a system of two stationary Alfvén waves would be attached to the planet. The waves would be carried by a strong electric current system. When destabilized through plasma instabilities, it would behave as a strong radio source. Without analysing the plasma instabilities, we can make predictions about the shape of the radio emission, and some of the time dependences of the received flux.