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Detecting magnetic fields in exoplanets through Auroral Radio Emission

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The detection of magnetic fields in exoplanets gives the possibility of investigating an important condition for the development of life on alien worlds. Magnetospheres act as shields preventing the arrival of ionised and potentially dangerous particles at the surface of the planets. On the other hand, the intense magnetic activity of parent stars could have influenced the atmospheric composition, in an early phase. Both planetary magnetospheres and stellar activity play important roles in creating a good environment for the development of life.

The detection of planetary magnetic fields is quite challenging. One possibility to infer it is through radio observations. In fact, the interaction between the central star and the planet can trigger Auroral Radio Emission (ARE). The interaction can be due to the stellar wind impacting the planet's magnetosphere or to the planet crossing the stellar magnetosphere. In both cases the emission is due to Electron Cyclotron Maser Emission (ECME), respectively above the magnetic pole of the planet or of the star. SKA-LOW or SKA-MID are the most promising telescopes of the next decades.

We will discuss how ARE can give indications on planetary magnetic fields, together with preliminary results.

Research area

Cradle of Life

Primary author: TRIGILIO, Corrado (Istituto Nazionale di Astrofisica (INAF))

Presenter: TRIGILIO, Corrado (Istituto Nazionale di Astrofisica (INAF))

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