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"Auroral Radio Emission in Exo-Planetary Systems"

As in the case of the magnetized planets of the solar system, the interaction between the central star and the planet can trigger streams of particles that cause auroral radio emission (ARE), due to Electron Cyclotron Maser (ECM). The characteristics of this emission make it visible and recognizable even at large distance, opening new opportunities for the study of exoplanets and for the research of extra-terrestrial life. While at optical and IR wavelengths it will be possible to investigate the atmospheric composition of exoplanets, only in the radio band, via the analysis of the ARE, it would be possible to discover and to characterize any magnetosphere. This is of great importance since magnetic fields act as a shield that protect life against external particles.

ARE has been detected in many different types of stars, from Magnetic Chemically Peculiar stars to Brown Dwarfs. In the first case it was studied and modeled since 20 years, allowing us to understand the main characteristics of ECM that could be present also in planetary systems.

In recent years, thanks to the sensitivity of the new generation radio interferometers, there have been many attempts to detect the ARE due to Star-Planet Interaction (SPI). It has been detected in late type stars, possibly due to SPI, but not prooved. One important point is to understand the best observing strategies. In particular, the choise of sample of planetary systems to observe, the frequency bands, the instruments, the number of observations that can give us the best chance of detection and the proof that it is due to SPI.

IAA Severo Ochoa Meeting: Addressing Key Astrophysical Questions from Granada

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