The effects of stellar winds and magnetic fields on exoplanets

Aline Vidotto*[1]

[1]School of Physics and Astronomy, University of St Andrews – North Haugh, St Andrews, KY16 9SS, United Kingdom

Abstract

The great majority of exoplanets discovered so far are orbiting cool, low-mass stars whose properties are relatively similar to the Sun. However, the stellar magnetism of these stars can be significantly different from the solar one, both in topology and intensity. In addition, due to the present-day technology used in exoplanetary searches, most of the currently known exoplanets are found orbiting at extremely close distances to their host stars (lower than 0.1 au). The dramatic differences in stellar magnetism and orbital radius can make the interplanetary medium of exoplanetary systems remarkably distinct from that of the Solar System. To constrain interactions between exoplanets and their host-star's magnetised winds and to characterise the interplanetary medium that surrounds exoplanets, more realistic stellar wind models, which account for factors such as stellar rotation and the complex stellar magnetic field configurations of cool stars, must be employed. In this talk, I will review the latest progress made in data-driven modelling of magnetised stellar winds. I will also show that the interaction of the stellar winds with exoplanets can lead to several observable signatures, some of which that are absent in our own Solar System.

*Speaker