
On the study of habitability conditions by merging asteroseismic and space climate techniques

Maria Pia Di Mauro*¹, Raffaele Reda*², Luca Giovannelli², and Francesco Berrilli²

¹Istituto di Astrofisica e Planetologia Spaziali (INAF-IAPS) – Via del Fosso del Cavaliere 100 00133
Roma, Italy

²University of Study of Rome Tor Vergata – Italy

Abstract

We propose a new synergic strategy that merges the potential of asteroseismology with solar space climate techniques in order to characterize solar-like stars and their interaction with hosted exoplanets. The method is based on the use of seismic data obtained by the space missions Kepler/K2 or TESS Transiting Exoplanet Survey Satellite, coupled with stellar activity estimates deduced from ground-based campaigns.

Our investigation allows us to obtain not only a highly accurate characterization of the mother star and its orbiting planet, but also to study the stellar magnetic activity and the star-planet interaction in analogy to the Sun-Earth system allowing to determine the extension of the exoplanetary magnetosphere and the values of stellar wind dynamic pressure. This information, coupled with the precise age estimation by asteroseismology, will allow determining how long an atmosphere could resist to the action of stellar wind enabling to directly quantify the portion of the atmosphere which could potentially be eroded.

*Speaker