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# The Hunt for Planets in Open Clusters with HARPS and HARPS-N

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## Abstract

Thousands of extrasolar planets have been discovered so far, and after the pioneer era, when the discovery of a single planet was a notable event, the interest is moving to the more complex work of planet and planetary system taxonomy, trying to put some order and eventually understand why they are so different from each others. The characterization of planets is tied to the knowledge of their host stars. Nearly all planets known so far however belong to isolated field stars, and their mass and radius are affected by large errors that transfer directly onto the precision of the planet parameters. On the contrary, distances, ages, mass and overall characteristics of stars in Open Clusters are much better measured than for field stars. OC stars are chemically homogeneous, so we can effectively investigate the effect of the presence of a planetary systems on the host star chemistry, e.g. if the observed trend of chemical elements with respect to their condensation temperature is effectively related to the presence planets. Curiously, at the present time, only less than ten planets have been confirmed or validated around Main Sequence stars in OCs. In this proposed talk I will give a short historical review on previous searches for exoplanets in OCs, then I will introduce our on-going survey aimed at detecting Neptune-mass planets around close, intermediate-age OC stars with HARPS (8 night/year) and HARPS-N (5 nights/semester, within the GAPS program). I will discuss our observational strategy and how we are dealing with activity, the main limiting factor in this kind of research, and the impact of the forth-coming K2 observations on our search. I will finally present our latest discoveries, including the first planetary multiple system around a OC star.

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