* Name of the supervisor: Roberto Silvotti
* Téléphone: +39-011-8101937
* Email: silvotti@oato.inaf.it

* How long ?: 5 months
* Where ?: Osservatorio Astrofisico di Torino, Pino Torinese
* grant: maybe (maximum some contribution to the lodging)
* Field: Exoplanets of evolved (post-RGB) stars
* Pre requisite: Would be very useful some knowledge/experience in:
- data reduction of spectroscopic data
- data reduction of photometric data
- algorithms for transit search in photometric data

Title: Planets of post-RGB stars
---

Abstract (no more than one A4 page):
---
If a planet enters the envelope of an expanding giant star, its survival depends on a number of poorly constrained parameters, in particular its mass. Theoretical models (e.g. Villaver & Livio 2007, ApJ 661, 1192; 2009, ApJ 705, L81; Nordhaus & Spiegel 2013, MNRAS, 432, 500) predict a gap in the final distribution of orbital periods, due to the opposite effects of stellar mass loss (planets pushed outwards) and tidal interactions (planets pushed inwards) during the red giant (RG) and the asymptotic giant branch (AGB) phases. Current observations of evolved (post-RGB) planetary system are totally insufficient to confirm or reject this prediction given the very small number of systems known.
In the last 6 years a few first planets/BDs have been detected orbiting post-RGB stars, in particular extreme horizontal branch subdwarf B (sdB) stars and cataclysmic variables.
Most of them were detected through the timing method, using either the stellar pulsation or the eclipse timing as a clock (see e.g. Silvotti et al. 2007, Nature, 449, 189).
However, to date not a single bona fide planet has been identified orbiting an isolated white dwarf (e.g. Hogan et al. 2009, MNRAS, 396, 2074), which means that we are still ignorant about the final configuration of >95% of planetary systems.
Over its five year primary mission, GAIA is expected to astrometrically detect few hundreds of WD planets (M > ~1 Mjup) in long period orbits, but the likelihood of planets surviving in close orbits around WDs will likely remain an open question for some years.

In this context I am working in different projects:
1) the EXOTIME program to search for sdB planets in large orbits (see http://www.na.astro.it/~silvotti/exotime/ for more details);
2) search for sdB planets/BDs in close/intermediate orbits from radial velocities with Harps-N@TNG and Harps@ESO (see Silvotti et al. in press at http://www.na.astro.it/~silvotti/exotime/silvotti_tucson.pdf);
3) preparatory work and simulations to search for WD planets with GAIA (Silvotti et al. 2011, AIP Conf. Proc. 1331, 336, http://adsabs.harvard.edu/abs/2011AIPC.1331..336S).

Depending on his/her interests and knowledge/experience, the candidate could work on one of these topics.