

Planets of the other suns (for general public).

What is the future of the Solar System and mankind on Earth? How long can we stay on our planet and where should we move when necessary? These once science-fiction questions may now be answered with scientific methods, by studying newly discovered planets around other suns.

Since the discovery of the first extrasolar planetary systems by Wolszczan & Frail (1992), Mayor & Queloz (1995) and Marcy & Butler (1996) about 2000 planets were found around other stars. The richness of exoplanets and the architectures of planetary systems that continue to emerge are astounding and raise questions about the general picture of planet formation and evolution. To achieve such a stage of understanding, continuing studies of planetary systems in various stellar environments are essential.

The PennState-Toruń Planet Search (PTPS), one of the largest radial velocity based planet searches, and the largest ongoing project devoted to evolved, low- and intermediate-mass stars. Its aim is to deliver a sizable sample of planetary systems around stars significantly older than the Sun and therefore affected by the evolutionary changes of their suns. By fully characterizing all the stars from the sample, including the host of newly discovered planetary system, the project will also deliver foundations for a physical description of planetary systems evolution as well as star-planetary system interaction processes.

Our project is based on systematic observations of radial velocities of a large number of stars, measured in most cases with one of the largest optical telescopes in the world, the Hobby–Eberly Telescope. Periodic variation of stellar radial velocity, can be interpreted as presence of a companion. We already presented 20 extrasolar planetary systems using that technique. Within this project we propose to continue that monitoring of our target stars with smaller 2-4 m class telescopes in Europe. We expect to detect several tens of new planetary systems around stars much older than our Sun and therefore have an insight into the future of our Solar System.