

Contrary to what one might think, the shape of our Galaxy – the Milky Way – still remains a mystery. The reason of this is the fact that we are “immersed” in the Milky Way and therefore unable to observe the Milky Way from the outside. How many spiral arms does the Galaxy have? Does the Milky Way have an outer ring as some other galaxies do? How far does the Galactic disc extend? All these questions may be answered thanks to Cepheids – young pulsating stars, distance to which can be measured with the famous period-luminosity relation discovered by an American astronomer Henrietta Leavitt over 100 years ago.

Currently, the most serious problem with the studying of the Milky Way structure is that we only know Cepheids in the Sun’s nearest neighbourhood, about 10 thousand light years away from us. The aim of this project is to extend the list of known Cepheids in the Galaxy to greater distances and to explore the global structure of the Milky Way. To achieve this goal, we will use long-term photometric observations obtained by the world’s largest sky survey for variability – the OGLE project. We expect to discover at least several thousand Cepheids which will multiply the number of known stars of that kind in our Galaxy.

We also expect to identify tens of thousands of pulsating stars belonging to the Cepheid family: RR Lyrae stars and delta Scuti stars. Such a huge sample will be an invaluable material for many types of studies: from the star formation history, through the distribution of the interstellar matter, to the analyses of the stellar interiors and pulsation mechanisms.