

DESCRIPTION FOR THE GENERAL PUBLIC

The main goal of the project is to calibrate a distance determination method that would serve to accurately measure distances to the galaxies from our neighborhood. Such measurements will allow in the future to calibrate other standard candles using which we could reach even farther and determine better the value of Hubble constant or in general – so called: cosmic distance scale.

The method we propose is based on very hot, relatively big and massive (and thus very bright) stars that reside in binary systems. We can easily observe such stars even in quite distant galaxies, like M31 or M33. If such a system of orbiting stars is oriented in a way that every now and then one star occults the other (so called eclipsing system), it is possible to measure a distance to them.

To be able to use this method, however, one has to calibrate it first. For this reason we are going to observe at least five of such eclipsing systems located in a close galaxy Large Magellanic Cloud, to which we know the distance with a very high accuracy. These five systems will be chosen from almost 30 thousands candidates of similar systems.

Thanks to very precise observations obtained with some of the World-largest telescopes located in Chile we will be able to measure sizes, masses and temperatures of the stars from the system, as well as their brightness. Having all these characteristics and a known distance to the Large Magellanic Cloud we will be able to calibrate our distance determination method with unprecedented accuracy.

Eventually in the future it will be possible to measure accurately distances to similar systems in more distant galaxies. Using standard observations we will be able to measure radius and brightness of a star and then translate those values into a distance using our calibrated method.