

General Public Overview

In October 2015, after a year of test phase, we have launched our distributed computing project: Universe@home. This project is the first volunteer computing project conducted within Polish (Warsaw) University. Up-to-now about 4000 people take part in scientific calculations supporting studies of the greatest puzzles of the Universe.

Participation in this research is absolutely simple and effortless. The only thing you need is a computer connected to the Internet. You just install a client program found on Universe@homehomepage¹ and the rest is done automatically. Client program downloads data, performs computations, and returns the results to the server. What is even more important, if a user needs their computer for CPU-heavy job, the client program will suspend the scientific computations giving full priority to personal user tasks. Such an approach allows to perform a large-scale simulations of stellar systems, like galaxies, and conduct studies of computationally demanding astrophysical problems, which are out of reach for most of computer clusters.

One of the major issues in modern astrophysics is connected to the formation and evolution of XRBs. These amazing objects host a mass transferring star, which feeds the compact star accretor (neutron star or a black hole). This process results in an extremely energetic radiation in the X-ray band. Despite being rare, X-ray binaries are of high importance for our understanding of the Universe. Thanks to them we can learn about the behavior of matter in extreme conditions, which are unattainable on the Earth, and investigate relativistic objects such as stellar mass black holes, which have been found only in X-ray binaries.

Results of evolutionary studies on the nature of objects like XRBs may turn out incredibly valuable and will most likely have important implications for a number of branches of science like condense matter physics or evolution of massive stars. Until recently, computational power mandatory for such big scale evolutionary calculations was beyond our reach. However, the situation have changed now.

The Universe@home project will let us accomplish two things with one home run. We will not only explore the Universe and learn about astrophysical processes, but we will also provide the general public with a powerful educational tool. Without any scientific background or specialized equipment people may participate in main-stream research and can learn about Universe around them. The profits are hard to overestimate as the educated society is the key to a healthy and successful nation.

¹http://universeathome.pl/universe/install_boinc.php