

## Research

Research is done on the physical processes that take place in space. The objects of research vary from our sun to black holes, pulsars, and star clusters. There are six research groups.

Theoretical as well as observational research is done on the sun, stars and star clusters, with the emphasis on astrophysics. We take part in NOVA, the Netherlands Research School for Astronomy, that co-ordinates the astrophysics.

The presence of [SRON](#), the Netherlands Institute for Space Research, has led to a close collaboration, especially in the area of high-energy astrophysics. This collaboration gives researchers from Utrecht access to the most advanced satellite experiments in the area of X-ray astronomy. We obtain very important information on the very hot gases in the nuclei of active star clusters and in the nearby surroundings of compact objects like white dwarfs, neutron stars, and black holes.

Utrecht has a long tradition in the field of solar physics, and is therefore unique in the Netherlands. For this research our very own telescope at La Palma is used and also a number of experiments on board of various satellites which are directed at the sun. The expertise raised in this research is nowadays more applied at other astronomical observations.

More recently Utrecht plays a permanent role in the study of the evolution of stars, especially heavy stars that end their life spectacularly in a supernova explosion or a gamma-ray burst. Also binaries, systems where two stars strongly influence each others development, are an important subject for research. The combination of observational and theoretical models enables the researcher to test the ideas behind it. The same goes for research on groups of stars (star clusters) with a mutual origin, both in our own Milky Way and outside it.

Momentarily development of new instrumentation for satellites and telescopes for observations in polarized light takes place. With these instruments the sun, planets and in the future maybe even exoplanets close to other stars can be observed.

In the research for astrophysical plasmas the institute works closely together with the FOM Institute for Plasmaphysics Rijnhuizen, Nieuwegein. This kind of plasma is found as a product of powerful explosions, like supernova explosions. The remnants of such an explosion are an important research topic.

Modern satellite experiments which determine X-rays enable us to bring in detail and thus derive something from this explosion mechanism.