Red novae form a small class of stellar eruptions: only five objects of this class have so far been identified in our Galaxy. Despite similar names, red novae have nothing to do with classical novae. The latter are caused by nuclear runaways on surface of white dwarfs in binary systems, while the red-nova outbursts result from mergers of two stars, presumably forming a binary system in the past. Contrary to classical nova eruptions, which have almost no effect on the structure of the binary and can happen many times in the lifetime of a binary, red novae end the life of binaries and so they can happen only once during the lifetime of a binary. This is the main reason, why the red novae are observed so rarely, compared to the classical novae, which are discovered at a rate of a dozen per year in our Galaxy.

Observationally, the red novae can be quite easily distinguished from the classical novae. The latter become hotter, i.e. they become blue, with time and decline as very hot stars. The red novae, on the contrary, evolve to progressively lower temperatures, i.e. they become red with time, hence the name, and decline as very cool stars.

Three objects have particularly been important for investigations of the nature of red novae. The eruption of V838 Mon in 2002 raised a great interest among astrophysicists and in fact initiated a wide discussion on the nature of this type of stellar eruptions. The eruption of V1309 Sco in 2008 was not particularly spectacular but the object appeared to be a sort of Rosetta stone in understanding red novae. Thanks to archive photometry, we were able to investigate the evolution of the object during six years prior to the eruption and we showed that this was a binary system quickly evolving to its merger, which occurred in 2008 and produced the observed outburst. CK Vul is a remnant of the oldest historical nova observed in 1670-72. For years the object was considered as a classical nova, despite its light curve, quite unusual as for a classical nova. Our submillimeter observations of CK Vul, published in *Nature*, provided us with decisive arguments against the classical nova, but strongly supporting the idea that the 1670 eruption resulted from a stellar merger. Our observations also showed that rare isotopes of carbon, nitrogen and oxygen are exceptional abundant in CK Vul. This clearly evidences that the matter has partly been processed in nuclear burning, presumably in the progenitor of the 1670 eruption. We hope that our current and future observations of the object will allow us to constrain on the nature of the burning and thus on the nature of the progenitor.

A merger event forms a single star from a binary system. Thus this a very important episode in the evolution of stars that totally changes the status and identity of the stellar object. From observations we know that the star arising from a merger - a red supergiant with a radius of several astronomical units - is surrounded by a large amount of cold matter, rich in dust and molecules, and extending up to distances comparable to the dimensions of the solar system. Theoretical considerations suggest that this matter should finally form a disc surrounding the central star. Planets can be formed in this disc, similarly as in protostellar discs. It is thus difficult to find a phase in the stellar evolution, which would be more deserving extended and thorough observational studies than the red novae, except supernovae, perhaps. Therefore, taking into account the fact that we have conducted successful studies of red novae for more than ten years - that have resulted in publishing about 30 research papers - it is quite obvious and natural that we want to continue these important and exciting studies. Hence our application for financing the research during next three years from the funds of NCN.

In course of the next three years we are going to concentrate on observational investigations of the known red novae in the Galaxy. The observations will be conducted in a wide spectral range, i.e. in the optical, infrared, submillimeter, and radio waves. We have already submitted observing proposals, and we are going to submit new ones, to the most important and effective telescopes and instruments, e.g. VLT, Gemini, ALMA, APEX, IRAM. We are also planning to run numerical simulations of various physical processes for a better interpretation and understanding of the observational results. If a new red nova is discovered in meantime, we will certainly be willing to contribute in investigating its nature. The results of our studies will be published in scientific journals.