

Among galaxies filling our Universe, a few percent are characterized by extraordinary properties. These galaxies can be a hundred times brighter than the “normal” ones (like our galaxy – Milky Way – whose source of radiation are mainly stars). Furthermore, their brightness can change strongly during months, days or even minutes. Certainly, it is not the emission from stars or interstellar matter that is responsible for it, but relatively small area in the center of a active galaxy.

The objective of the project is to explore high energy processes taking place in these amazing objects. The project focuses on explaining the origin of the highest energy electromagnetic radiation (gamma-rays) from a certain group of active galaxies (radio-loud active galaxies without broad emission lines). The role of violent gamma-ray flares taking place in these objects, is emphasized.

To achieve this aim computer models simulating processes occurring in the inner parts of active galaxies are developed. Two scenarios for the formation of gamma-ray flares inside active galaxies are thoroughly studied. We suspect that they may be the reason for the transient gamma ray flares.

Despite many years of researches and very dynamic progress in gamma-ray astronomy, there are many unexplained questions related to gamma-ray flares from active galaxies. The project will help to solve some problems and make active galaxies less mysterious.