Active galactic nuclei are galactic centers in which energy is not emitted by components such as stars or interstellar dust, but mainly by processes around the supermassive black hole. The variety of the observed spectra of active galaxy nuclei results from the different angles at which we observe them and the amount of gas and dust that feed the black hole, and this variety is the basis of the morphological classification of these objects.

Active galactic nuclei with morphological changes have attracted the attention of astronomers in recent years, although such phenomena have occasionally been noticed in the past. However, such events were considered exceptions. As the amount of astronomical data grows, the number of such objects increases as well, but the nature of such a rapid variation over the years remains still unknown. This extremely fast process of changing the brightness and (dis)appearance of a galaxy's spectrum is inconsistent with the standard view of classifying active galaxies according to the viewing angle.

Moreover, the expected variability related to the behavior of matter around the black hole does not explain such drastic changes in brightness over such a short period of time, and the process behind such changes remains a mystery. To enable the verification of models describing this phenomenon, it would be convenient to use observational data of known objects changing the morphological type collected in the catalogue.
There are a number of proposed models, including the one published in Sniegowska et al. 2020, postulating specific instabilities in gas flow into the black hole.

Objects will be selected from the literature, but sample selection will not be straightforward for older works. In the past, the term ‘active galaxies changing morphological type’ was not used and the phenomenon was not always adequately described in publications. The sample measurements will be supplemented by new search results for such objects in archival data from the Swift X-ray satellite, which will be performed as part of the project. For each of the objects, basic information will be collected, such as the timescale of changes, the amplitude of the brightness change, and the estimation of the mass of the object.

The observed timescales of brightness changes will then be compared with the ones predicted by probable scenarios. For example, the timescales vary drastically between expected dust cloud eclipses, where the change is most likely caused by extinction, and intrinsic disturbances in the flow of matter around the black hole due to star tidal disruption events. A sharp increase in brightness and a slow decay are also characteristic of a star's tidal disruption. Disk instabilities predict a similar rate of increase and decrease in brightness. Using those scenarios among others, I plan to separate objects into subclasses representing physically different mechanisms. I will propose more precise quantitative parameters characterizing the basic modes of variability of galaxies changing the morphological type.
The organization of optical observational data from the literature, their collection in a catalogue and searching the archive with X-ray data for these objects will allow the verification of theoretical models.