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Progress Report

MODELLING CHANGING-LOOK (CL) AGN PHENOMENON USING ACCRETION DISK INSTABILITIES

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Apart from regular, low-level stochastic variability, some AGN occasionally show exceptionally large changes in the luminosity, spectral shape and/or X-ray absorption. The most notable are the changes of the spectral type, when the source classified as a Seyfert 1 becomes a Seyfert 2 galaxy, or vice versa. Thus a name was coined of 'Changing-Look AGN' (CL AGN). The origin of this phenomenon is still unknown, but for most of the sources there are strong arguments in favor of the intrinsic changes.

Understanding the nature of such rapid changes is a challenge to the models of black hole accretion flows since the timescales of the changes are much shorter that the standard disk viscous timescale. We aim to model the CL AGN phenomenon using the time-dependent evolution of a black hole accretion disk unstable due to the dominant radiation pressure. We use a 1-dimensional, vertically integrated scheme, and focus on the variability timescales and amplitudes, which can be regulated by the action of large-scale toroidal magnetic fields and the presence of an inner optically thin flow, like Advection-Dominated Accretion Flow (ADAF). We thus modify the inner boundary condition of the cold disk flow, and we mimic the formation of the MRI-inactive zones, that suppress instabilities, by parameterizing their relative importance according to a local accretion rate.