Contribution ID: **43** Type: **not specified**

Searching for newborn AGN

Monday, 22 July 2024 12:50 (20 minutes)

Observations and models indicate that the fraction of active galaxies in the local Universe is about 10% . As most large galaxies host a supermassive black hole (SMBH), this can be interpreted as a duty cycle, where 10% of galaxies are active at any given time. Estimating this activation rate is important to constrain central black hole feeding mechanisms in galaxy evolution models. Black hole ignition events, which involve a galaxy transitioning from a quiescent or star-forming state to a an AGN are, however, exceptionally challenging to detect. For our work, we took advantage of the very large public photometric monitorings that are currently ongoing (ZTF) together with machine-learning algorithms for selecting interesting objects. Black hole ignition event candidates were selected form a parent sample of spectrally classified non-active galaxies (> 2.300.000 objects), that currently show optical flux variability indicative of a type I AGN, according to the ALeRCE light curve classifier. In this talk I will present spectral results for the most convincing case of new AGN activity, for a galaxy with a previous star-forming optical classification, where the confirmation spectrum shows the appearance of prominent, broad Balmer lines without significant changes in the narrow line flux ratios. MIR colors have also evolved from typical non active galaxy colors to AGN-like colors and current X-ray detections are consitent with typical AGN emission. This work is presented in Arévalo et al. 2024(A&A letters 683, L8). In this talk I will present the selection strategy, statistics, and predictions for similar studies with the Vera Rubin LSST.

Funding request, please specify

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Session Classification: AGN selection and classification