

*Invited Lecture*

**SPECTRAL VARIABILITY OF ACTIVE GALACTIC NUCLEI  
IN THE CONTEXT OF LARGE TIME-DOMAIN SURVEYS**

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It is now widely accepted that the optical variability of active galactic nuclei (AGN) originates from the complexity of the environment surrounding the central Supermassive black hole (SMBH), producing stochastic broad line and continuum light curves. Measuring the high correlation between the light curves of the continuum and broad emission lines might indicate the common driving process of their variability.

However, the nature of physical processes behind the optical variability of AGN is still the enigma that will be subjected to an investigation of upcoming large photometric and spectroscopic synoptic time-domain surveys such as s Vera C. Rubin Observatory Legacy Survey of Space and Time (LSST), and Manuakea Spectroscopic Explorer (MSE).

Here, we report an investigation of the effects of AGN variability observables (time lag, periodicity, and structure-function time scales) in light curves on LSST survey strategy as a function of different possible operations simulations(OpSims) using the metrics analysis framework (MAF). We discuss the best observing strategies of the LSST for detecting AGN variability observables (the opensource code is publicly available at <https://github.com/LSST-sersag/>). However, the proposed proxies could be applied to other spectroscopic and photometric surveys to select cadence strategy decisions.