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The Dawn of LSST AGN Data and Science Collaboration: A Discussion on Photometric Reverberation Mapping and its Implications

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Photometric reverberation mapping serves as a vital complementary technique to spectroscopy reverberation mapping (RM) for probing the Active Galactic Nuclei (AGN). Even that photometric RM could not provide detailed information as spectroscopy RM, the obvious advantage of photometric RM is to efficiently measure accretion disk and Broad Line Region (BLR) sizes and host-subtracted luminosities for large AGN samples. The imminent Vera C. Rubin Legacy Survey of Space and Time (LSST), equipped with six broad-band filters, promises to revolutionize our understanding by analyzing the properties of hundreds of millions of variable AGN. For example, the redshifted Halpha line, transitioning into the LSST i and z bands at redshifts around 0.16 and 0.38, respectively, may be strong enough to contribute about >30% to these LSST broad bands.

In anticipation of this groundbreaking survey, we aim to foster an interactive dialogue with the LSST AGN Science Collaboration and In-kind teams to collaboratively explore:

- Effective strategies for accretion disk reverberation mapping.
- Extracting AGN emission line curves from LSST data, focusing on two prospective methods.
- The feasibility of using LSST photometric redshifts to accurately identify the filters that captures the emission light curves important for photometric reverberation, e.g. the Halpha, Hbeta lines.
- The potential luminosity difference between cosmological models at LSST redshifts, and how these can be systematically explored through the rigorous application of LSST RM, with the goal to enhance our understanding of the nature of dark energy.

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