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Reverberation Mapping the Hot Dust Emission in AGN from VEILS

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Due to observational limitations, the size and structure of the obscuring circumnuclear dust in active galactic nuclei (AGN) is not well understood. Using reverberation mapping techniques the size of this hot dust emission can be determined by analyzing the temporal variations of the infrared (IR) emission from the dust in response to variations in the accretion disk continuum luminosity. Over the last 30 years, the dust reverberation time lag (and, thus, radius) has been measured by monitoring the optical and near-IR emission in about 20 galaxies. And similar to the broad emission-line region, it was found that the time lags determined by dust reverberation correlate tightly with AGN luminosity, $\tau \propto L_{AGN}^{0.5}$, a relation that may be used as a cosmological standard candle. Now we are taking AGN dust reverberation mapping to the next level, targeting about 500 AGN as part of the VISTA Extragalactic Infrared Legacy Survey (VEILS) in order to firmly establish dust time lags as a standard candle. VEILS is the first wide and deep IR extragalactic time domain survey that will monitor AGN in the optical and near-IR for at least 3 years. We will map the dust time lags of AGN over a range of redshifts, 0 < z < 1.2, allowing us to independently constrain cosmological parameters. The first season of VEILS has already been conducted. Here, I present preliminary light curves of AGN from our survey and discuss how we plan on using our light curves in order to establish AGN dust time lags as a standardizable candle.

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Yes

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