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Quasars as high-redshift standard candles

Thursday, September 7, 2023 10:00 AM (1 hour)

The non-linear X-ray to UV luminosity relation in quasars can be used to derive their distances, and to build a Hubble diagram up to z˜7 which shows a strong tension with the standard LCDM model. I will present a series of observational results strongly supporting the redshift stability of the relation and its intrinsic precision. In particular, I will show that (1) the slope of the relation does not evolve with redshift, (2) the spectral properties of the quasars in our sample are the same at all redshifts, (3) the dispersion of the relation becomes much smaller if precise spectroscopic flux measurements are used, (4) the Hubble diagram of quasars and that of supernovae are in full agreement in the common redshift range, (5) the residual intrinsic dispersion is fully explained by quasar variability and disk inclination effects. I conclude that the X-ray to UV non-linear relation is due to a universal, redshift-independent physical process, and provides reliable distance measurements.

Presenter: Prof. RISALITI, Guido (University of Florence)