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Building the high-redshift Hubble Diagram with quasars

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In recent years, quasars have shown to be standardizable candles, allowing us to extend the Hubble Diagram from the Supernovae Ia range ($z \sim 0-1.5$) up to very high redshift ($z \sim 6$), and therefore explore the expansion history of the Universe at previously uninvestigated epochs. This implementation has shown the presence of a strong tension ($>4\sigma$) with a standard flat Λ CDM model, and indications in favor of Interacting Dark Sector alternative models. In this talk, I will first discuss the reliability of quasars as standard candles, focusing on possible sources of biases and systematics and how we can address them to build a valid quasar sample for cosmology. I will then focus on the observed dispersion of the luminosities relation, describing its possible causes and if and how we can lower it to get more precise distance measurements. Finally, I will discuss the high-redshift tension with the standard flat Λ CDM model.

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