

UCLA Department of Physics & Astronomy

# COLLOQUIUM

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## The Hubble tension: hints of new physics?

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The standard  $\Lambda$ CDM model gives a successful description of many astrophysical observations. However, in the past few years a tension has developed between local determinations of the Hubble constant and the value predicted from early universe probes. If confirmed, this so called Hubble Tension, would require additional physical ingredients beyond  $\Lambda$ CDM, e.g. early dark energy, or new particles. After describing the tension, I will provide an update of our 20-year long effort to measure the expansion history of the universe and thus the Hubble constant using gravitational time delays, highlighting recent results based on lensed quasars from the TDCOSMO collaboration (the union of Holicow/STRIDES/SHARP collaborations), and from the multiply imaged supernova Refsdal. I will conclude my talk by discussing the prospects for achieving 1-2% precision and accuracy on  $H_0$  in the next few years and thus resolving the Hubble tension.

Undergraduates Welcome!