X49a A 10% H_0 measurement with the doubly lensed quasar HE 1104−1805

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Time-delay cosmography leverages strongly lensed quasars to measure the Universe's current expansion rate, H_0, independently from other methods. The sample of TDCOSMO lenses used for such measurement is dominated by quadruply lensed quasar. While these offer the most constraints on the main deflector's mass profile, doubles allow the sample to expand by a factor of 5 and sample a broader population of lens galaxies, hence preventing eventual selection biases.

In my talk, I will present the first TDCOSMO analysis of a double-imaged source, HE 1104−1805, including the measurement of the necessary ingredients: (1) Time delay: Using over 14 years of monitoring data, we measure the time delay with a precision of 7%. (2) Resolved kinematics: Using MUSE data, we extract stellar velocity dispersion measurements in three radial bins with a precision ranging from 8% to 20%. (3) Employing HST imaging and marginalizing over various modelling choices, the time delay distance reaches 9%. By combining kinematics, forward modelling and external convergence measurements, we break the mass-sheet degeneracy and measure H_0 with a 10% precision from a single system.

The high relative precision of the time delay enables us to achieve an H_0 precision comparable to that obtained with quadruply lensed quasars. This work is a stepping stone towards precisely measuring H_0 with a large sample of doubly lensed quasars to supplement the current sample of quadruply lensed quasars.