Contribution ID: **198** Type: **Talk in a parallel session**

Time delay cosmography with galaxy clusters with a new strong lensing tool

Thursday, 11 July 2024 18:10 (10 minutes)

In recent years, the precision of the Hubble constant (H_0) measurements has significantly improved, revealing some discrepancy between the estimates inferred from local and early-universe probes. This tension might be ascribed to the presence of unknown systematic effects or some deviation from the current cosmological model (flat ΛCDM), thus pointing to the need of new physics. Adding new independent and complementary techniques to measure H_0 could provide crucial insights into unveiling the origin of this tension.
Strong gravitational lensing (SL) of time-varying sources offers such an opportunity. As recently demonstrated in a spectacular fashion in the case of the strongly lensed "supernova Refsdal" by a massive galaxy cluster, a robust modeled mass distribution of the lens and a measurement of the time-delays of multiple images of the supernova (SN) can be used to provide competitive and independent constraints on the Hubble constant and other geometrical cosmological parameters.
In the effort to exploit time-delay cosmography on cluster scale, I will show the first results from the SL analysis of two galaxy clusters with multiply lensed quasars, based on a new SL modeling tool called Gravity.jl (credit: M. Lombardi). The availability of time delay measurements among quasar images in these clusters, in combination with the high computing performance and flexibility of this SL tool, provide an opportunity to test a number of possible systematics in the measurement of the Hubble constant. I will also discuss the prospects of using Gravity.jl in the new era of high-quality and high-volume strong lensing data.

Primary author: DI ROSA, Giorgia (University of Ferrara)

Presenter: DI ROSA, Giorgia (University of Ferrara)

Session Classification: Exploring the Universe with strong gravitational lensing

Track Classification: Dark Matter (DM): Exploring the Universe with strong gravitational lensing