



Contribution ID: 13

Type: **not specified**

Illuminating the dark Universe through strong gravitational lensing in the SKA era

Tuesday 25 November 2025 12:00 (15 minutes)

Dark matter and dark energy represent 95% of the Universe and they are still unknown. Gravitational lensing is one of the most powerful tools for constraining the “dark Universe”, as it can directly infer dark energy (via gravitational time delays) and dark matter (via low-mass lenses). In this talk we will overview these fundamental investigations and show our latest results from the combination of strong lensing and VLBI, which can reveal low-mass haloes ($\sim 10^6 M_\odot$) and measure time delays at high precision.

These studies are currently limited by the paucity of lensing systems known. Finding novel and effective ways to identify strong lenses represents a new challenge that has to be addressed now, when the so-called “era of precision cosmology” is about to start with the next generation of telescopes. We will present novel methods to search for strong lenses in the radio and in the time domain that, teamed-up with the SKA-VLBI, can shed light on these open questions at unprecedented precision.

Topics

Cosmology

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Session Classification: Cosmology