**Title:**
Combining Strong and Weak Lensing for cluster mass modelling: A BUFFALO view of Abell 370

**Abstract:**
Cluster lensing is a powerful probe to constrain the formation of structures and the different physical mechanisms that are involved. Depending on the local projected mass density, two lensing regimes can be observed: strong lensing, that manifests as high distortion and/or multiple images of background sources, allows to constrain the structure of cluster cores with high precision. Weak lensing, on the other hand, requires a statistical measurement, and allows to map the mass distribution at large radial scale, and connect clusters to their filamentary environment. The combination of these two regimes is therefore particularly powerful, but requires dedicated modelling methods, as well as high-quality adapted datasets.
In this context was born the BUFFALO survey, that extended the HST coverage of the 6 Frontier Fields clusters by a factor of ~4, adding high-resolution weak lensing data to the pre-existing deep strong lensing constraints.
In this talk, I will present the mass modeling techniques that we developed to combine high-quality strong and weak lensing constraints to self-consistently model cluster mass distribution at all scales, and I will describe the analysis conducted on Abell 370, a massive cluster located at $z = 0.375$. From the reconstructed total projected mass distribution in the 6’x6’ BUFFALO field-of-view, we have obtained the distribution of massive substructures outside the cluster core, and found that the mass distribution in Abell 370 is extended along the North-West and South-East directions. While this finding is in general agreement with previous studies, our detailed spatial reconstruction provides new insights into the complex mass distribution at large cluster-centric radius. In addition, we explored the impact of the extended mass reconstruction on the model of the cluster core, and in particular, we attempted to physically explain the presence of an important external shear component, necessary to obtain a low root mean square separation between the model-predicted and observed positions of the multiple images in the cluster core.