



Contribution ID: 378

Type: **Invited talk in a parallel session**

Least model-dependent strong lensing properties of galaxy clusters

Strong gravitational lenses are massive cosmic objects, like galaxies or galaxy clusters, which can map an extended background source, like a galaxy, into several highly distorted and magnified images. Analysing the properties of those images yields important information about the distribution of the deflecting mass and the background source. Common approaches to reconstruct the source or the deflecting mass distribution model the *global* properties of the source and the lens. They obtain a consistent description of the entire configuration by refining the model until it matches the observation to a predefined precision.

In contrast, this talk shows a different approach to infer *local* properties of the gravitational lens and to reconstruct the source only using the properties of the multiple images without assuming a lens or a source model. The approach can be applied to galaxy or galaxy-cluster lenses in the same way and yields the maximum information all lens models agree upon. Showcasing two example lenses, I highlight

- 1) how to obtain a smoothness scale for dark matter with it from only three multiple images in a newly discovered cluster and
- 2) how to identify and resolve limits of lens models that may lead to highly unrealistic dark matter properties.

References:

- Lens method overview: <https://arxiv.org/abs/1906.05285>
- Examples: <https://arxiv.org/abs/2207.01630> and <https://arxiv.org/abs/2306.11779>

More information about me:

Dr. Jenny Wagner
Bahamas Advanced Study Institute & Conferences
<https://thegravitygrinch.blogspot.com>
https://en.wikipedia.org/wiki/Jenny_Wagner

Primary author: WAGNER, Jenny (Bahamas Advanced Study Institute and Conferences)

Presenter: WAGNER, Jenny (Bahamas Advanced Study Institute and Conferences)

Session Classification: Gravitational lensing, shadows and photon rings

Track Classification: Experimental Gravitation (EG): Gravitational lensing, shadows and photon rings