USM-exgal lensing group
on our Wendelstein observatory
plus other USM-exgal group members
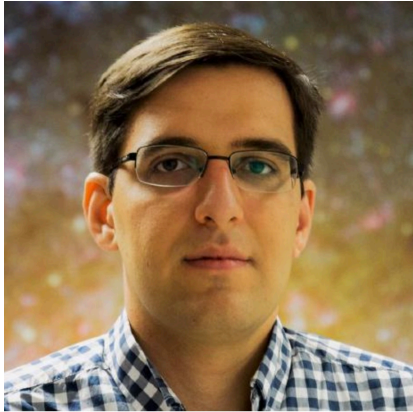
group lead Leo ➡️

"lensers": Arno, David, Giacomo, Stella, Anik, Laurence, Tamas, Yue

Cluster weak lensing & cluster line of sight image simulations
Tamas Varga, PD, David Rufer Master student

-stacked cluster analysis with DES data, calibrate Richness-Mass relation (McClintock, Varga et al 2019, and Varga et al 2019).

-boost factor correction: estimate leakage of cluster members into background sample in mock and real data and correct for them.

Synthetic galaxy clusters and observations based on Dark Energy Survey Year 3 Data, Varga, Gruen, Seitz et al. 2022

-LSST, in-kind:

Use either observed + or simulated input catalogues for cluster lines of sights and deep field together with ML to generate "statistically equivalent" line of sight galaxy catalogues for cluster lines of sights and render them into images to which gravitational shear is applied, then measure signal with MetaCal.

-Generating artificial galaxy images with Deep Learning (w. David Rufer)

LSS weak lensing, HOS
Anik Halder, Laurence Gong, PhD students,
Yue Pan (undergraduate, Chicago) , David Gebauer Master student

Integrated 3 pt function,

$\text{Zeta\_pm (theta)} = <\text{xi\_pm (theta) M\_ap(theta\_sm)}>$ for cosmic shear, but also combining with galaxy distribtutions.

The integrated three-point correlation function of cosmic shear, Halder, Friedrich, Seitz, Varga 2021

Response approach to the integrated shear 3-point correlation function: the impact of baryonic effects on small scales, Halder, Barreira 2022

In prep:

Cosmology from the integrated shear 3-point correlation function: simulated likelihood analyses with machine-learning emulators , Gong, Halder, Seitz, Barreira

The integrated 3-point correlation function of projected cosmic density fields: framework for a practical higher-order weak lensing and projected galaxy clustering analysis, in preparation, Halder et al.

LSS weak lensing, Full PDFs
Anik Halder, Alexandre Barthelemy
together with Oliver Friedrich in Daniel Gruens Group

The PDF perspective on the tracer-matter connection: Lagrangian bias and non-Poissonian shot noise, Friedrich, Halder, Boyle+ 2022

Eg.:

Euclid Preparation XXIX: Forecasts for 10 different higher-order weak lensing statistics, Euclid Consortium, eprint arXiv:2301.12890

The cumulant generating function as a novel observable to cumulate weak lensing information, Boyle, Barthelemy, Codis, Uhlemann, Friedrich 2022

Galaxy strong lensing and Time Delays, H0
Giacomo Queirolo PhD student, Arno Riffeser,
Leon Ecker Master student,
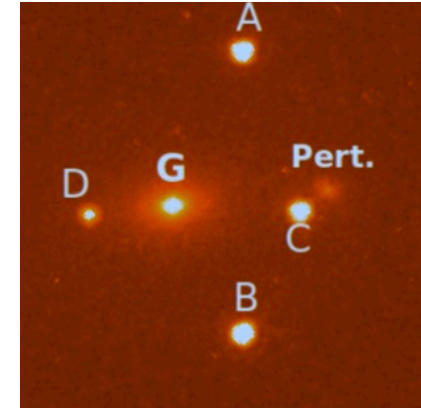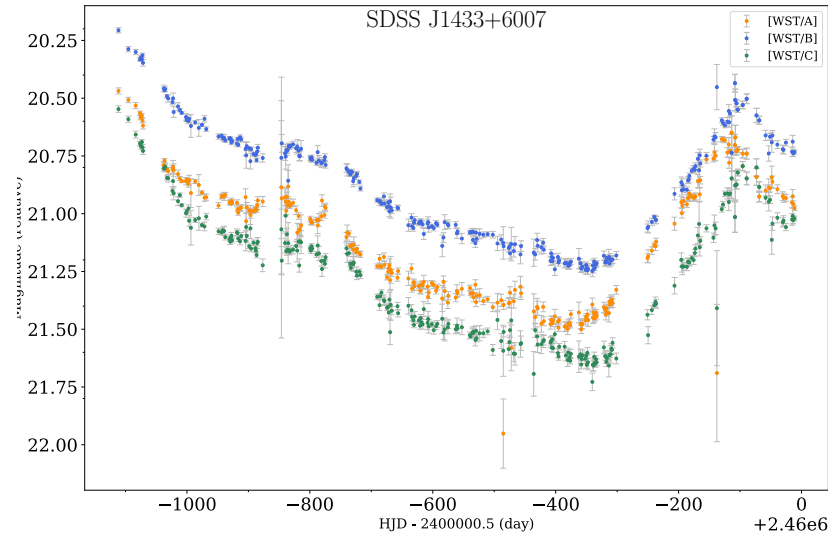
-HST strong lensing analyses using lenstronomy

-monitoring variability with 2m Wendelstein, Difference imaging, then time delay estimates using PyCS

-in prep "Time Delay Cosmography: Analysis of Quadruply Lensed Quasar SDSSJ1433" , Queirolo, Seitz, Riffeser, Kluge, et al.

-Leon analyses HST and WST-2m TD data for another lensing system