

# Bachelor/Master Theses

2024



Intensity Interferometry (II) is a method which measures the angular diameter of stars and was created in the 1960s but has been renewed over the last decades due to improved technology. The method makes use of the second correlation function of electromagnetic waves, meaning the photon rates at a certain time and position. The coincidence rate depends on the angular size of the source and the baseline, the distance between the detectors/telescopes. In contrast to amplitude interferometry, II is insensitive to atmospheric turbulences, which allows for kilometer-scale baselines offering an angular resolution on the scale of microseconds. Arrays of Imaging Atmospheric Cherenkov Telescopes (IACTs), such as H.E.S.S. or the future CTA, are suitable for II. The ECAP team designed an intensity interferometer for the H.E.S.S. telescopes and has already performed II measurements. We are now looking to improve this setup and detail our data analysis.

## Bachelor thesis

- Design permanent II setup for H.E.S.S. telescopes
- Improved data analysis methods for H.E.S.S. II data
- Correlation measurements in the lab

## Master's thesis

- Simulation of binary star systems for II measurements
- Improved data analysis methods for H.E.S.S. II data

## Physics topics related to this work:

- Intensity interferometry in astronomy
- Optics of Cherenkov telescopes
- Photo-detectors such as Photomultiplier Tubes

## Skills acquired during this work:

- Learn hardware design, systematic experimental work
- Statistical analysis of data, programming

## Interested? Please get in touch:

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