



Das Institut für Physik  
Institutsbereich Geophysik, Astrophysik und Meteorologie

lädt zu folgendem Vortrag

im Rahmen des **Astrophysikalischen Kolloquiums** ein:

**"The potential planet-forming region in  
circumstellar disks: Constraining the structure  
with MATISSE/VLTI and ALMA"**

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To study the initial conditions for planet formation, it is crucial to obtain spatially resolved observations of the innermost region of protoplanetary disks. Long-baseline interferometry is very promising in this context, as it allows to resolve structures in the inner disk region comparable to the size of the inner solar system. In addition, multi-wavelength observations allow a more thorough investigation of the structure of this disk region, as they trace different disk layers. While MATISSE/VLTI will be sensitive to the thermal emission of the warm dust located in the upper disk layers, ALMA traces the emission of the cold dust in the entire disk. As both instruments achieve a similar angular resolution, the combination of these complementary data sets potentially provides constraints for the radial and vertical structure of the innermost disk region.

We evaluate the potential of the combination of observations with MATISSE/VLTI and ALMA to constrain the radial profile, the flaring, and the scale height of the dust phase in the potential planet-forming region of circumstellar disks in nearby star-forming regions. Based on a disk model with a parameterized dust density distribution, we apply 3D radiative transfer simulations to obtain scattered light and thermal reemission maps. These are used to derive the corresponding wavelength-dependent visibilities one would obtain with MATISSE as well as images of ALMA observations reconstructed with the CASA ALMA simulator.

We find that ALMA observations allow one to constrain the surface density of the innermost region in protoplanetary disks. MATISSE, on the other hand, is sensitive to the flaring and the scale height of the disk. Nevertheless, the requirements for the visibility accuracies allowing constraining the disk flaring and scale height can hardly be reached. However, the combination of ALMA and MATISSE observations will significantly lower the required accuracies.

Zeit: **Mittwoch, 21. März 2018 um 16:00 Uhr s.t.**

Ort: **Seminarraum 05.13** (1. Stock), Universitätsplatz 5, 8010 Graz

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