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ABSTRACT

Aims. Here the aims go
Methods. Here the methods go.
Results. Here the results go
Conclusions. Here the conclusions go

Key words. stars: pre-main sequence – planetary systems: protoplanetary disks – stars: imaging stars – individual object: HD 142666

1. Introduction

Pre-main sequence (PMS) objects are characterized by observational features of the early evolutional stage. These features are emission lines, infrared- and/or ultraviolet excesses and brightness variations. There are two distinct classes of such PMS objects: The Herbig Ae/Be- and the T Tauri stars (TTS), whereby Herbig Ae/Be stars are objets of intermediate mass to massive (1.5 to 4 $M_{\odot}$/4 to 10 $M_{\odot}$, for Ae and Be, respectively) and TTS are low mass ($< 1\,M_{\odot}$). With Herbig Ae crossing the instability region of the Hertzsprung Russel (HR) diagram in their evolution**?**. Around the stars there are various classifications of disks: They are based on the spectral energy distribution (SED) in the mid-/far-infrared (IR) excess, which - for intermediate-mass stars - can either be fit by a power-law continuum or requires an additonal blackbody and can be split into Group I and II (GI/GII). At first, these were believed to be clearly split into distinct geometries (flat- and flared disks), but in GII there are**?**.

2. Target description

In this paper, we investigate the object HD 142666, belonging to the ρ Ophiuchi star formation region**?**. It shows irregular brightness variations and colour changes, the star becomes redder when fainter, which can be explained by looking edge-on onto the circumstellar dust disk, with grain-sizes of 1 µm. In the line of sight, the dust clouds obscure the star and cause the reddening, which is a typical phenomenon for Herbig Ae/Be stars called 'non-periodic Algol-like brightness minima/UX Ori type variations'. The light of the star is always diluted by its dusty environment, which makes a precise determination of the absolute magnitude and luminosity difficult. Furthermore, HD 142666 is a type II Herbig Ae star (showing a double-peaked H_{α} emission profile)**?**. HD 142666 is an isolated A3/A8 star with an inner radius slightly larger than the dust sublimation radius at sub-AU scale with its disk being a prototype of group II (GII) disks**?**.

3. Observations and data reduction

3.1. Long-baseline interferometry with VLTI/MATISSE

HD 142666, an intermediate-mass Herbig Ae star has been studied quite frequently already (e.g., observations done with IOTA (), AMBER, and especially MIDI (), in case of MIDI it was operated in N-band (8 – 12 µm)**?**). Multi-Apterture mid-Infrared SpectroScopic Experiment (MATISSE) observations of HD14266 in L/M- and N-band were performed on several occasions from March to June 2019. Two arrays, the Unit Telescopes (UT) and the Auxiliary Telescopes (AT) of the Very Large Telescopic Interferometer (VLTI) of the European Southern Observatory (ESO) in Paranal, Chile were used. For the UTs there is only one configuration, which is of interest for the N-band observations. However, for the ATs there are several configurations that have been used (small, medium, large and extended). Calibration and editing of the (*u, v*) data was performed using standard techniques within the MATISSE data pipeline and the common pipeline library, the ESO Recipe Execution Tool (EsoRex).

3.2. Data reduction of the N-band data

The data was reduced with the MATISSE Data Reduction Software (DRS) using the 1.5.1 version of the pipeline.

4. Model geometry

5. Results

6. Discussion

7. Summary and conclusions

References