High-contrast imaging of protoplanetary disks

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Propositions

accompanying the thesis

High-contrast imaging of protoplanetary disks

1. Scattered-light observations of protoplanetary disks can be deceptive: shadows cast onto the outer disk surface can create the appearance of disk structures. (*Chapter 3*)
2. When rings are present in the disk scattering surface, we can determine the height profile of the disk surface by measuring the offset of the ring centers with respect to the star. (*Chapter 4*)
3. To acquire reliable disk images in total intensity we need to "waste" valuable telescope time observing suitable reference stars. (*Chapter 2*)
4. Detailed calibrations of high-contrast imagers are needed to determine reliable polarized surface brightnesses of disks. (*Chapter 5, 6*)
5. The next big step in high-contrast imaging of protoplanetary disks is to acquire accurate *degree of linear polarization* images.
6. The common use of the terms of 'flat' and 'flaring' disks is misleading. It gives the erroneous impression that we are dealing with thin and thick disks, respectively, while both can be of similar thickness.
7. We can greatly enhance the scientific output of the current 6-10 m (and future larger) class telescopes by adding small ($\sim$ 50 cm) telescopes, dedicated to measuring the absolute photometry of the same targets observed by the large telescopes.
8. We need to extend the Amsterdam-Granada database (full Stokes scattering properties of different types of dust grains) to more wavelengths (e.g., sub-mm) for reliable comparison of lab measurements with the observations of dust in protoplanetary disks.
9. The focus of the scientific community on first detections creates a rat-race that often leads to falsly claimed detections, which could and should have been avoided.
10. When a potential (proto)planet is detected within a disk with angular differential imaging (ADI), it can in most cases be falsified by simulating ADI on polarimetric images of the disk.

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