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High-contrast imaging polarimetry of exoplanets and circumstellar disks

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Propositions accompanying the thesis

High-contrast imaging polarimetry of exoplanets and circumstellar disks

by Rob G. van Holstein

1. The high polarimetric accuracy required for quantitative polarimetry of circumstellar disks and exoplanets can be achieved by performing detailed calibrations of high-contrast imagers.

   (*Chapter 2 & 3*)

2. Measurements of the near-infrared linear polarization of self-luminous exoplanets and brown dwarf companions can reveal disks around these companions and uniquely constrain the orientation of these disks.

   (*Chapter 4 & 5*)

3. To quickly implement and test new observing techniques, it is vital to directly interact with the instrument and have easy access to the expertise of the staff of the observatory.

   (*Chapter 4 & 6*)

4. Mirror coatings of high-contrast imagers should not be optimized for maximum reflectivity, but should be designed to have a retardance close to 180º.

   (*Chapter 2, 3 & 7*)

5. An image derotator (K-mirror) is a source of both problems and opportunities to polarimetrists.

   (*All chapters*)

6. Images of the (fractional) Stokes parameters describing polarization should be shown on a diverging color map with different colors for positive and negative values and a shared, neutral color for zero.

7. The astronomical community should agree on the (underlying) sign conventions and reference frames for the mathematical description of polarization.

8. Openly available, well-documented, and easy-to-use software packages foster collaborations, improve productivity, and enhance the accuracy, transparency, and reproducibility of scientific results.

9. We should rethink space-based astronomy and planetary science in light of the coming revolution in spaceflight brought by large, rapidly reusable rockets.

10. The unit prefix μ for micro should be written in a roman (upright) font style and not in an italic (slanted) font style.