Novel approaches for direct exoplanet imaging: Theory, simulations and experiments

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Propositions accompanying the thesis

Novel approaches for direct exoplanet imaging: theory, simulations and experiments

1. Misinterpretation of the scientific methodology of others can lead to new insights.

   [Chapter 2 & 3]

2. Having single-mode fibers instead of detector pixels in the coronagraphic focal plane relaxes the design of the apodizer mask for pupil-plane coronagraphs.

   [Chapter 3 & 4]

3. Good software design acts as a "force multiplier" for scientific research.

   [Chapter 5]

4. While scintillation is safely ignored in most high-contrast imaging applications, its interference with lagged phase speckles can produce surprisingly strong asymmetries in coronagraphic images.

   [Chapter 6]

5. Coronagraphs with a one-sided dark zone can provide excellent post-coronagraphic performance in conjunction with high-order wavefront sensor telemetry.

   [Chapter 7 & 8]

6. Blind application of artificial intelligence algorithms leads to a lack of understanding of the scientific problem at hand.
7. Project post-mortem analyses should be conducted for astronomical instruments, and their reports should be made openly available.
8. Automated unit testing is underused in astronomical software projects.
9. Software packages are rarely mentioned in talks or cited in publications. This discourages ongoing development and maintenance, and fragments the software stack in astronomy.
10. Never underestimate to what degree face-to-face social interaction is fundamental to your own mental wellbeing.
11. Feature creep is the enemy of getting things done.
12. Flying stars can be the result of a broken telescope.

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