



Astrophysics > Instrumentation and Methods for Astrophysics

Imaging power of multi-fibered nulling telescopes for extra-solar planet characterization

Francois Henault

(Submitted on 22 Jul 2011)

In this paper are discussed the nulling and imaging properties of monolithic pupil telescopes equipped with a focal plane waveguide array, which could be envisaged as precursor space missions for future nulling interferometers or coronagraphs searching for habitable planets outside of our solar system. Three different concepts of nulling telescopes are reviewed, namely the Super-Resolving Telescope (SRT) having multiple, non-overlapping exit sub-apertures and the Sheared-Pupil Telescope (SPT), either unmasked or masked with a Lyot stop placed at its exit pupil plane. For each case simple theoretical relationships allowing to estimate the nulling rate, Signal-to-Noise Ratio (SNR) and Inner Working Angle (IWA) of the telescope are established or recalled, and numerical simulations are conducted. The preliminary results of this study show that the most promising designs should either be a SRT of high radiometric efficiency associated with an adequate leakage calibration procedure, or a masked SPT with potentially deeper nulling rates but lower SNR, depending on what kind of performance is to be preferred.

Comments: 14 pages, 6 figures

Subjects: **Instrumentation and Methods for Astrophysics (astro-ph.IM)**; Earth and Planetary Astrophysics (astro-ph.EP); Optics (physics.optics)

Journal reference: Proceedings of the SPIE vol. 8151, 81510A (2011)

Cite as: [arXiv:1107.4626v1](https://arxiv.org/abs/1107.4626v1) [astro-ph.IM]

Submission history

From: Francois Henault [[view email](#)]

[v1] Fri, 22 Jul 2011 20:46:37 GMT (1329kb)

[Which authors of this paper are endorsers?](#)

Download:

- [PDF only](#)

Current browse context:

astro-ph.IM

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1107](#)

Change to browse by:

[astro-ph](#)

[astro-ph.EP](#)

[physics](#)

[physics.optics](#)

References & Citations

- [INSPIRE HEP](#)
([refers to](#) | [cited by](#))
- [NASA ADS](#)

Bookmark (what is this?)

