

Tunable Kernel-Nulling for direct detection of exoplanets

1. Calibration and performance

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ABSTRACT

Context. Lorem ipsum
Aims. Lorem ipsum
Methods. Lorem ipsum
Results. Lorem ipsum
Conclusions. Lorem ipsum
Key words. Lorem ipsum

1. Introduction

1. Nulling interferometry
2. Kernel nulling
3. Integrated optics & phase shifters

2. Materials and methods

1. VLT/ASGARD (/NOTT?)
2. Integrated optics & phase shifters
3. Studied architecture
4. Observation conditions (Vegga-like star, noise etc.)
5. Calibration methods (Fig 2 & 3)

Genetic Algorithm

Input obstruction

Machine Learning?

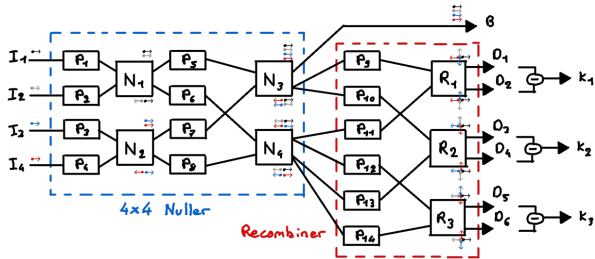


Fig. 1. Studied architecture

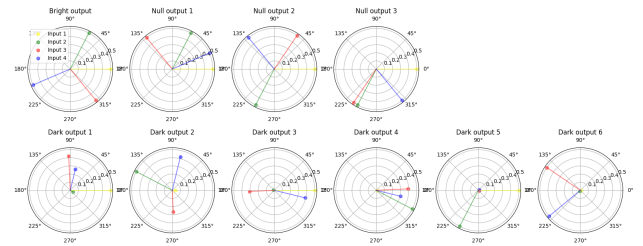


Fig. 2. Perturbed phases

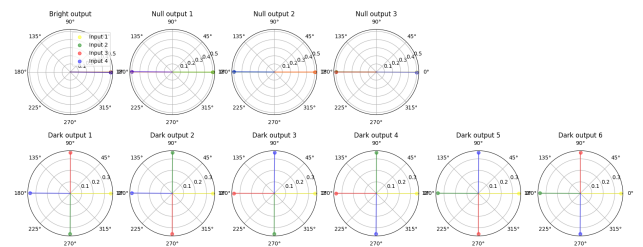


Fig. 3. Calibrated phases

3. Results and limitations

1. Numerical results
 - Kernel-Null depth (Fig 4 & 5)
 - Kernel inversion and swapping
2. Laboratory results
3. Laboratory limitations (ex. crosstalk)

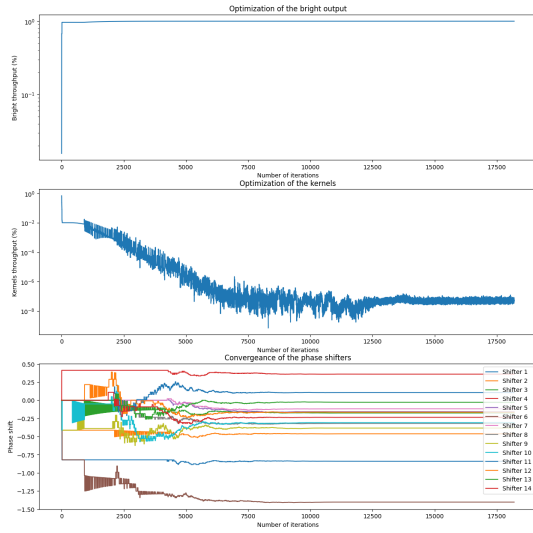


Fig. 4. Calibration using genetic algorithm

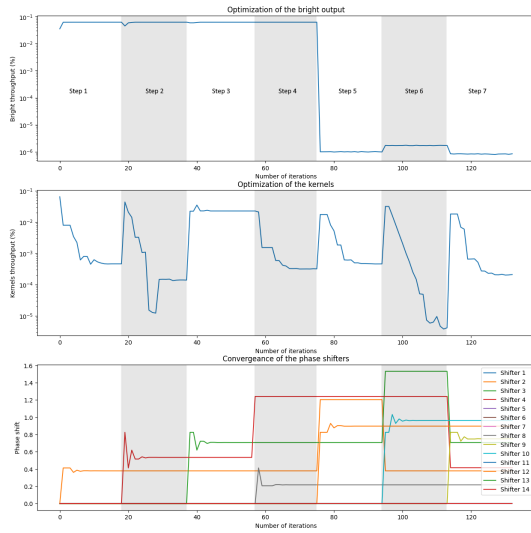


Fig. 5. Calibration using input obstruction

4. Conclusions and prospects

1. Conditions for noticing a performance gain
2. Need of a post calibration characterization process to identify the outputs
3. Deeper statistical analysis is required to truly characterize performance gain (the null depth is not the only relevant parameter)
4. Architecture limitations (ex. no amplitude modulation, no photometric outputs)

Acknowledgements. Lorem ipsum

References

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