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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. VLTI/ASGARD (/NOTT?)
2. Integrated optics & phase shifters
3. Studied architecture
4. Observation conditions (Vegga-like star, noise etc.)
5. Calibration methods (Fig 2 & 3)
    - Genertic Algorithm
    - Input obstruction
    - Machine Leaning?

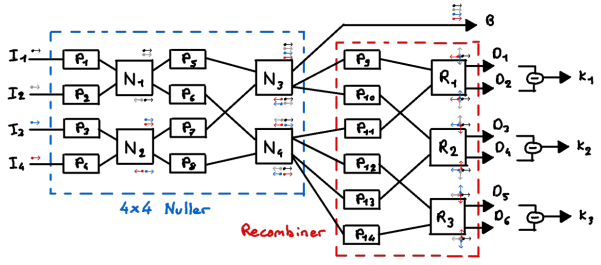

Fig. 1. Studied architecture

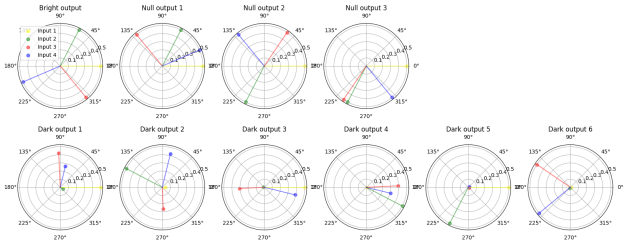

Fig. 2. Perturbed phases

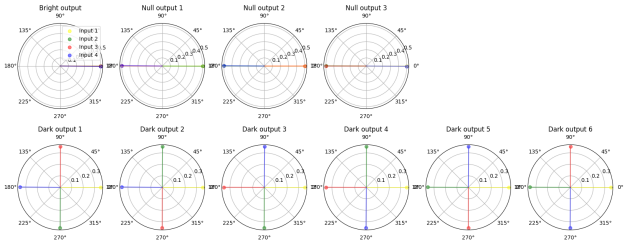

Fig. 3. Calibrated phases

3. Results and limitations

1. Numerical results
    - Kernel-Null depth (Fig 5 & 6)
    - Kernel inversion and swapping
2. Laboratory results
3. Laboratory limitations (ex. crosstalk)

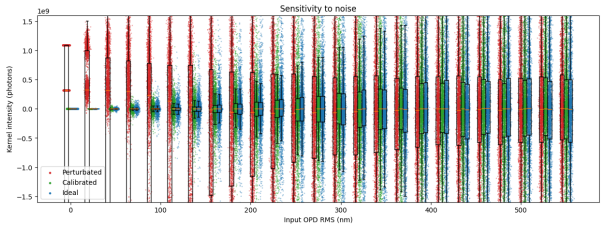

Fig. 4. Sensitivity to input noise

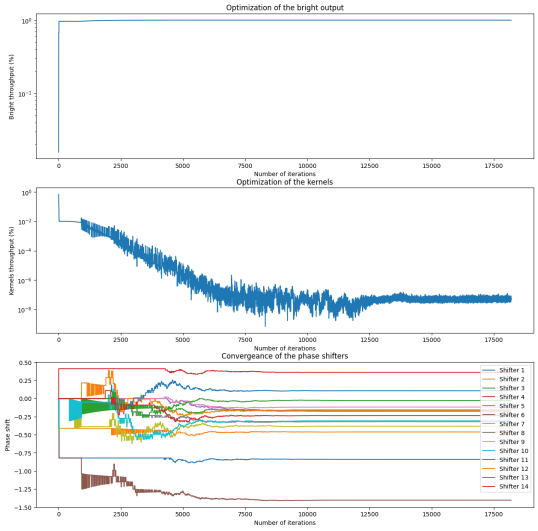

Fig. 5. Calibration using genetic algorithm

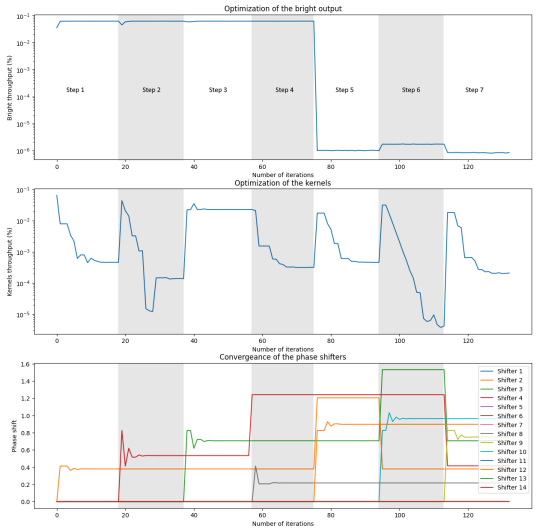

Fig. 6. Calibration using input obstruction

4. Conclusions and prospects

1. Conditions for noticing a performance gain
2. Need of a post calibration caracterization process to identify the outputs
3. Deeper statistical analysis is required to truely caracterize 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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