

Numerical estimation and modeling of the wavefront error breakdown in adaptive optics

mardi 23 octobre 2018 12:20 (20 minutes)

Summary

For ground-based telescopes, Adaptive Optics (AO) systems aim to correct the wavefront disturbances due to atmospheric turbulence. The Point Spread Function (PSF) is one of the metrics of the AO system correction performance when compared to the diffraction limited one. Estimating the AO corrected PSF is important for image inversion which requires accurate estimation of the PSF over the scientific field. This estimation relies on the knowledge of the AO system error budget. Establishing the various contributions of this error budget is an issue because of the propagation process of errors through the AO loop filtering. We have developed a model for SCAO system residual error breakdown which includes temporal error, anisoplanatism, aliasing, noise and fitting terms. Thanks to GPU acceleration, it leads to PSF estimation at ELT scale in half a minute

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Classification de Session: Wave-Front Error & Performance Evaluation