
B-band adaptive-optics imaging of close binaries with the Palomar Well-Corrected Subaperture

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Abstract

The steep falloff of Strehl ratios to short wavelengths has largely limited adaptive optics (AO) systems on ground-based telescopes to red and longer wavelengths. However, improved wavefront correction can enable partial AO correction across the full optical regime. A simple approach to improved wavefront correction is to use an AO system's deformable mirror to correct a telescope subaperture instead of the entire pupil. This approach was implemented as the 1.5 m "Well-Corrected Subaperture" (WCS) on the Palomar Hale telescope by installing an additional optical relay between the telescope pupil and the deformable mirror. Here we report AO-corrected images of close binaries in the B band that were acquired with the WCS. Several known binaries and other multiple systems were resolved in the B-band, with measured angular separations ranging from 721 to 142 milli-arcseconds. Such a simple optical modification can thus be used to quickly implement a visible AO capability on any existing AO system. In particular, it can be used to rapidly implement visible AO imaging on the next generation of 30-m class ground-based telescopes, for which clear off-axis telescope subapertures can be significantly larger than coeval space-based telescopes.

Keywords: blue adaptive optics, subaperture adaptive optics

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