

The Offset Dust Ring of HR 4796A

Zahed Wahhaj¹, Michael C. Liu², Eric L. Nielsen², Beth A. Biller³, Tom L. Hayward⁴ and the Gemini NICI Planet-Finding Campaign Team.

¹*European Southern Observatory, Chile*, ²*University of Hawaii, USA*, ³*MPIA, Germany*, ⁴*Gemini South Observatory, Chile* ⁴

We present images of the dust ring around the 10 Myr old star, HR 4796A, in the J, H, K_S and narrow-band methane filters, obtained using the Near Infrared Coronagraphic Imager on the 8-m Gemini South Telescope. These unsaturated images, for the first time, clearly show the position of HR 4796A relative to its circumstellar ring (radius $1''$). We used a Bayesian approach with Markov Chain Monte Carlo simulations to constrain the offset vector between the two. The resulting probability distribution from this analysis, demonstrates with $>15\sigma$ confidence that the ring center is offset from the star along of PA of 206.7 ± 2 degrees. This agrees with PA of the South-West extension of the disk, which is 206.47 ± 0.04 degrees. Thus the brighter side (North-West) is closer to the star. This finding supports the previous theory of "peri-center glow". It is difficult to explain the offset without the hypothesis of an orbiting planet. We also find that the reflectivity of the dust, which extends from 45 AU to 120 AU, is uniform across the JHK_S -bands.