

## Direct Imaging of Extrasolar Planets

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### Abstract:

One of the most significant advances in the studies of extrasolar planets in recent years has been the emergence of direct detection as a mature technique. Using advanced image processing and adaptive optics, companions can be detected at star:planet brightness ratios of  $10^5$  and at separations of about an arcsecond. This allows detection of young (<100 Myr) giant (2-10 Jupiter mass) planets in wide (10-100 AU) orbits. Several surveys have searched for such planets. One particularly striking success is the discovery of the four-planet system orbiting HR8799; I will discuss the characteristics of this interesting system, including spectra of the planets and long-term stability.

The next major advance in this field will be the deployment of dedicated exoplanet imaging systems, with advanced adaptive optics, on 8m telescopes - particularly the Gemini Planet Imager (GPI) and the VLT SPHERE instrument. GPI is an order of magnitude more sensitive than current facilities and can detect planets as small as 0.5 jupiter masses and at separations as small as 3 AU, producing significant overlap with microlensing. I will give an overview of a planned GPI exoplanet survey and discuss its statistical depth.