Advanced Optical Designs for Imaging Exoplanets

The optical design requirements for imaging an exoplanet are notoriously challenging. This requires precise control of unwanted radiation from the parent star as well as exquisite sensitivity to reflected or emitted light from the planet. For example, to image a terrestrial exoplanet, a coronagraph must reduce the light from a star by up to ~10 orders of magnitude over a substantial spectral bandwidth, while maintaining the light from a nearby planet. In this talk, I will discuss recent successes, current challenges, and future prospects in the field of exoplanet imaging. I will also present my recent work on the optical design of coronagraph instruments for large aperture telescopes.