

3D Vector Optical Modeling for TPF Coronagraph

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The TPF coronagraph has primarily been modeled with scalar diffraction theory treating coronagraphic occulters as planer 2D masks and making the standard scalar assumptions. We have developed an alternative approach which treats the electromagnetic field rigorously - ensuring at each step in the propagation that the field divergence is zero, and treating all occulters, apertures and Lyot stops as 3D objects with real and imaginary components to the permittivity. We have performed propagations in 3D, using a large Beowulf cluster, and will show results and discuss the differences between the vector and scalar theory and the tantalizing possibility of designing more optimal occulters in 3D.