

W09b

A Binary Shaped Mask Coronagraph for a Segmented Pupil

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We present the concept of a binary shaped mask coronagraph applicable to a telescope pupil including obscuration, based on previous work on a binary shaped pupil mask by Kasdin et al. (2005, *Appl. Opt.*, 44, 1117) and Vanderbei (1999, *Optimization methods and software*, 11, 451). Solutions with multi-barcode masks that "skip over" the obscuration are shown for various types of pupils of the telescope, such as SUBARU, JWST, SPICA, and other examples. The number of diffraction tails in the point-spread function of the coronagraphic image is reduced to two, thus offering a large discovery angle. The technique of mask rotation is also presented, which allows a post-processing removal of diffraction tails, and provides a 360 ° continuous discovery angle. It is suggested that the presented concept offers solutions that potentially will allow large telescopes with a segmented pupil in the future to be used as platforms for coronagraphs (Enya & Abe, *PASJ*, 62, 1407, 2010).