

**An Immediate Precursor to Debris Disks? Coronagraphic Observations of HD 100546**

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We present multicolor, optical coronagraphic observations of HD 100546, obtained with the Advanced Camera for Surveys. These data demonstrate the analytical power of coronagraphic observations. The HD 100546 system is a massive, old protoplanetary disk, and can be thought of as an immediate precursor to some of the debris disks that have been imaged with HST, like Beta Pictoris and HD 141569. The previously known spiral structures are revealed to have complex substructure within them, perhaps the result of an interior planet. Other explanations, like those seeking to explain the spiral arms as the result of disk inclination, are rejected. The multicolor observations show that the dust scatters more light at longer wavelengths: i.e. it is red with respect to the star. While this behavior is not uncommon in debris disks, its presence in this protoplanetary disk suggests that that the star is surrounded by a flattened optically thin structure. The optically thick disk is not seen in these images, indicating that its profile is fairly constant with distance. The envelope is redder (B-I is 0.6 mags larger than the star) than the reddest colors ever measured in debris disks (B-I is 0.2 mags larger than the star). We show that the disk color is similar to that of Kuiper Belt objects. In the later case, the color is due to the effect of cosmic rays on the icy surfaces of planetesimals. That effect may be at work here, although its time scale (~100 Myrs) is too large to work in HD 100546.