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Spiral Arms in the Protoplanetary Disk around MWC 758

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Transitional disks are protoplanetary disks characterized by an optically thin inner region, and considered to be key objects to get insights into new-born planets through disk-planet dynamical interaction.

We present the detection of the transitional disk associated with the Herbig Ae star MWC 758 in scattered light at $1.1 \mu\text{m}$, K' , and H bands using data obtained with HST/NICMOS, Subaru/IRCS, and Subaru/HiCIAO as part of the Strategic Exploration of Exoplanets and Disks with Subaru. The scattered light fills the dust-depleted cavity found in submm continuum, implying the dust filtration at the outer edge of the cavity that might be induced by planet(s). The most remarkable is that two spiral arms were resolved in the disk. This is the second discovery of the small-scale spiral structure in protoplanetary disks after SAO 206462 (Muto et al. 2012), suggesting that such structure is not unique. Based on the density-wave theory, a disk aspect ratio is estimated to be 0.18, and the mass of the perturber for the spiral to be $5_{-4}^{+3} M_{\text{Jup}}$, not inconsistent with the upper limits for the companion mass obtained in L' and K' bands. These data strongly suggest that MWC 758 is a young planetary system.