

Discovery of a 17 Myr old Debris Disk System in Lower Centaurus Crux by SPHERE

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ABSTRACT

We present the discovery images in H-band of a debris disk around a 17 Myr old star obtained by SPHERE. The star is at a distance of 96 ± 6 pc in the Lower Centaurus Crux molecular cloud. We determined using Bayesian Markov Chain Monte Carlo methods that debris is likely in the form of a dust ring with inner edge of 24.5 ± 1 AU, position angle $-74 \pm 1^\circ$ and an inclination to the line of sight of $17 \pm 2^\circ$. The disk imaged in scattered light is likely as narrow as the resolution of the images, roughly 5 AU (55 mas). We further estimate an eccentricity of 0.1 ± 0.03 , which could be caused by an unseen orbiting companion, a scenario similar to the HR 4796A debris disk. The disk has also roughly the same fractional luminosity compared to star ($L_{\text{disk}}/L_{\text{star}} = 3.3 \times 10^{-3}$) as HR 4796A and β Pictoris, however was not detectible by previous telescope facilities because of its very small angular size (radius $\sim 0.5''$) and faintness (contrast ~ 10 magnitudes) compared to the star. With the arrival of extreme adaptive optics systems like SPHERE and GPI, the morphology of smaller, fainter and more distant debris disks are being revealed, providing clues to the dust dynamics with proto-planetary bodies. We also review the nature of these newly discovered debris disks.