Thermal Emission in the Southwest Clump of VY CMa

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We present high spatial resolution LBTI/NOMIC 9â€“12 Î¼m images of VY CMa and its massive outflow feature, the Southwest (SW) Clump. Combined with high resolution imaging from HST (0.4â€“1 Î¼m) and LBT/LMIRCam (1â€“5Î¼m), we isolate the spectral energy distribution (SED) of the clump from the star itself. Us radiative-transfer code DUSTY, we model both the scattered light from VY CMa and the thermal emission from the dust in the clump to estimate the optical depth, mass, and temperature of the SW Clump. The SW Clump is optically thick at 8.9 Î¼m with a brightness temperature of âˆ¼200 K. With a dust chemistry of equal parts silicates and metallic iron, as well as assumptions on grain size distribution, we estimate a dust mass of 5.4 Ã— 10âˆ’5 M . For a gasâ€“toâ€“dust r 100, this implies a total mass of 5.4 Ã— 10âˆ’3 M . Compared to the typical mass-loss rate of VY CMa, the SW Clumprepresents an extreme, localized mass-loss event from 300 years ago.

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