

# Rotational Disruption as a New Mechanism of Dust Destruction and Implications

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We will first introduce a new mechanism of dust destruction based on centrifugal stress within extremely fast rotating grains spun-up by radiative torques, which is termed RAdiative Torque Disruption (RATD) mechanism. We will show that the RATD mechanism can successfully explain several puzzles in dust astrophysics, including (i) the NIR-MIR emission excess from young massive star clusters, (ii) the anomalous dust extinction and polarization towards SNe Ia, (iii) and Small Magellanic Cloud-like extinction curves with a steep far-UV rise in starburst and high redshift galaxies. We will then discuss the implication of RATD to probe internal structure of dust grains with observations which is currently a mystery of dust astrophysics. Finally, we discuss the effect of RATD for desorption of icy grain mantles and complex organic molecules (COMs) around young stellar objects. We will show that by disrupting the ice mantle on the grain surface into fragments, COMs can desorb from ice mantles at much lower temperatures than the classical sublimation from the original grain, which can explain observations of COMs in cold regions.