

## The Dynamical Influence of a Planet on the Dust Around $\epsilon$ Eridani

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Precise-Doppler experiments suggest that a massive ( $m \sin i = 0.86 M_J$ ) planet orbits at semimajor axis  $a = 3.4$  AU around  $\epsilon$  Eridani, a nearby star with a massive debris disk. The dynamical perturbations from such a planet would mold the distribution of dust around this star. We numerically integrated the orbits of dust grains in this system to predict the central dust cloud structure. For a supply of grains that begin in low-inclination, low-eccentricity orbits at 15 AU, the primary feature of the dust distribution is a pair of dense clumps containing dust particles trapped in mean-motion resonances of the form  $n : 1$ . These clumps appear to revolve around the star once every two planet revolutions. Future observations with the IRAM Plateau de Bure Interferometer, the SMA, or ALMA could detect these clumps, confirming the existence of the planet and revealing its location.

