

SOLVING THE MYSTERY OF DISAPPEARING ASTEROIDS WITH TELESCOPIC OBSERVATIONS, NUMERICAL MODELING, SPACE MISSIONS, AND LAB EXPERIMENTS.

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A couple of asteroids with perihelion distances of less than 0.2 au have been observed to show unexplained, short-lived activity during their perihelion passages. The activity is significant enough that it may destroy these asteroids over time, and in the process it contributes to the meteoroid population in the inner Solar System. Although we only have direct evidence for activity from this very limited sample, we know from evolutionary modeling of the population of near-Earth asteroids (NEAs) that all asteroids, that eventually reach similar perihelion distances during their dynamical evolution, are affected. This corresponds to about 70% of all near-Earth asteroids, and the disruptions offer us an independent avenue for constraining the bulk compositions of asteroids. We don't currently understand the mechanism(s) responsible for the activity, although a number of explanations have been proposed. I will describe our current efforts to understand the mechanism(s) riving the activity and ultimately destroying entire asteroids. These efforts range from observations and numerical modeling to space missions and lab experiments.