

Comet Shoemaker-Levy 9: Support for the Rubble Pile. Model

Paul R. Weissman, Jet Propulsion Laboratory, Pasadena, CA 91109

The observed behavior of comet Shoemaker-Levy 9 as it orbited and impacted Jupiter was consistent with predictions of the primordial rubble pile (Weissman, 1986) and fractal (Dorm et al., 1985) models for cometary nuclei. The comet displayed repeated disruption events along its orbit as sub-nuclei continued to separate from the individual fragments, and complete fading and dispersal of some smaller fragments. Using the rubble pile model, Asphaug and Benz (1994) demonstrated the reassembly of the disrupted comet into -15-20 fragments, with physically reasonable densities of 0.5 to 1.3 g cm⁻³. Impacting fragments deposited a substantial fraction of their energy in Jupiter's upper atmosphere, consistent with a partially dispersed rubble pile.