



The Daily Comet

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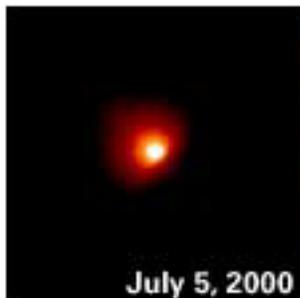
A Comet Cracks Up Close to Earth

Astronomers have watched a comet crack up. They used the orbiting Hubble Space Telescope to snap pictures of comet Shoemaker-Levy 9, which broke apart when it wandered too close to the massive planet Jupiter. But astronomers have never seen one crumble into pieces close enough to Earth to study it in detail. Until, that is, comet LINEAR came along.

During the summer of 2000, astronomers trained an armada of telescopes, including the Hubble telescope, on the mountain-sized comet. To their delight, the comet came unglued as it made a close pass by the Sun. LINEAR's crackup supports the popular theory that comets are made up of a cluster of smaller icy pieces called "cometesimals," which are weakly held together by gravity. When heated by the Sun, the icy pieces break apart. The cause of LINEAR's breakup was far different than comet Shoemaker-Levy's, which was pulled apart by Jupiter's gravitational muscle.

The Hubble telescope actually captured views of chunks of LINEAR's core, called a nucleus, sailing along the comet's tail. About half a dozen of these chunks, which scientists dubbed "mini-comets," had tails of their own. These mini-comets looked like a shower of glowing fireballs from fireworks. Never before had a telescope revealed comet pieces with such clarity.

Comet LINEAR



Why Study a Comet's Death?

By studying how comet LINEAR came apart, astronomers hope to learn how it was put together in the first place about 4.6 billion years ago. A comet's basic building blocks, the cometesimals, were built up from tiny grains of dust it collected in the early solar system. The cometesimals then gently began sticking together to build up comets, many of which were tossed out of the solar system by the giant planet, Jupiter. Some astronomers think that the pieces seen floating away from LINEAR may be those ancient building blocks, which theory predicts should be several tens of feet across.

Where Did LINEAR Come From?

Some astronomers believe that comet LINEAR was making its maiden voyage to the solar system after traveling for billions of kilometers from the vast comet storehouse called the Oort cloud. Scientists estimate that 20 to 30 percent of comet visitors are so fragile they completely crumble when they meet the Sun up close. Other comets can survive for as many as a thousand orbits around the Sun. One of the most celebrated is Halley's comet, which last appeared in 1986.

Other astronomers suggest that LINEAR may itself have been a fragile piece of a larger comet that visited our solar system more than 10 million years ago. LINEAR broke away from its parent comet after a pass around the Sun. Straggling behind its parent comet for millions of years, LINEAR finally returned to our solar system for one last circuit around the Sun.