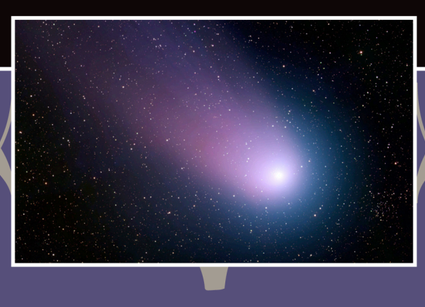


A comet's spectacular appearance begins with a small, icy object orbiting the Sun

For most of history, the seemingly random appearances of comets have been interpreted as bad omens from the heavens. However, as we learned to predict and understand comets, their visits became opportunities to enjoy their beauty and to study their structure. That structure starts in a tiny, icy nucleus just a few miles across and extends to two tails that can stretch for millions of miles across interplanetary space.



Beyond the Moon (1577)

Observing the Great Comet of 1577, Tycho Brahe estimates its distance and shows it to be at least four times farther than the Moon.

Woodcut of the Great Comet of 1577, J. Daschitzsky



Comets become predictable (1758)

The comet predicted by Edmund Halley returns, proving that comets have understandable, though often highly stretched, orbits around the Sun.

Orbits of Comet Halley and the planets from Mars to Neptune



Sun-swept dust tail (1901)

Karl Schwarzschild calculates that the curved, yellowish dust tail of a comet is swept back by light from the Sun pushing on the dust-sized particles.

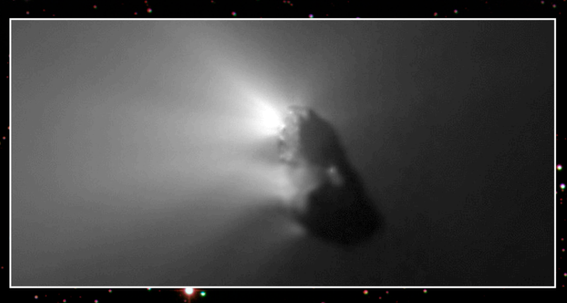
Great Comet of 1882, South African Astronomical Observatory



Wind-swept ion tail (1951)

Ludwig Biermann explains how the straight, bluish ion tail of a comet is swept back by the solar wind – a stream of charged particles flowing away from the Sun.

Comet Hale-Bopp, K. Hartnett



Dirty snowball (1986)

As the Giotto spacecraft flies past Comet Halley, it finds a several-mile-wide, dark, potato-shaped nucleus of ice and rock that is emitting jets of icy and dusty particles.

Nucleus of Comet Halley, Giotto Mission

The Nature of Comets

Background:
Comet NEAT, WIYN Telescope, 2004