
Comets may have come from other solar systems

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Courtesy of Southwest Research Institute
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Many of the best known comets, including Halley, Hale-Bopp and McNaught, may have been born orbiting other stars, according to a new theory.

The proposal comes from a team of astronomers led by Hal Levison of the Southwest Research Institute in Boulder, Colo., who used computer simulations to show that the Sun may have captured small icy bodies from "sibling" stars when it was young.

Comet McNaught over the Pacific Ocean in January 2007. (Credit: Sebastian Deiries, European Southern Observatory)

Scientists believe the Sun formed in a cluster of hundreds of stars closely packed within a dense gas cloud. Each star would have formed many small icy bodies, Levison and colleagues say—comets. These would have arisen from the same disk-shaped zone of gas and dust, surrounding each star, from which planets formed.

Most of these comets were slung out of these fledgling planetary systems due to gravitational interactions with newly forming giant planets, the theory goes. The comets would then have become tiny, free-floating members of the cluster.

The Sun's cluster came to a violent end, however, when its gas was blown out by the hottest young stars, according to Levison and colleagues. The new models show that the Sun then gravitationally captured a large cloud of comets as the cluster dispersed.

"When it was young, the Sun shared a lot of spit with its siblings, and we can see that stuff today," said Levison, whose research is published in the June 10 advance online issue of the research journal *Proceedings of the National Academy of Sciences*.

"The process of capture is surprisingly efficient and leads to the exciting possibility that the cloud contains a potpourri that samples material from a large number of stellar siblings of the Sun," added Martin Duncan of Queen's University, Canada, a co-author of the study.

The team cites as evidence a bubble-shaped region of comets, known as the Oort cloud,

that surrounds the Sun, extending halfway to the nearest star. It has been commonly assumed this cloud formed from the Sun's proto-planetary disk, the structure from which planets formed. But because detailed models show that comets from the solar system produce a much more anemic cloud than observed, another source is needed, Levison's group contends.

"More than 90 percent of the observed Oort cloud comets [must] have an extra-solar origin," assuming the Sun's proto-planetary disk can be used to estimate the Oort Cloud's indigenous population, Levison said.