New Crowd at the Solar System's Edge

When astronomer Jane Luu and her colleagues discovered a mammoth, icy body at the fringes of the solar system last October, they were thrilled but not surprised. The team's large-format detector, she notes, was designed to net just such an object—a 490-kilometer-wide miniplanet that ranks as the biggest and brightest body ever detected beyond Pluto.

Although the object, dubbed 1996 TL_{66}, was unexpectedly large, initial observations painted a familiar picture: a nearly circular orbit in a known reservoir of comets called the Kuiper belt.

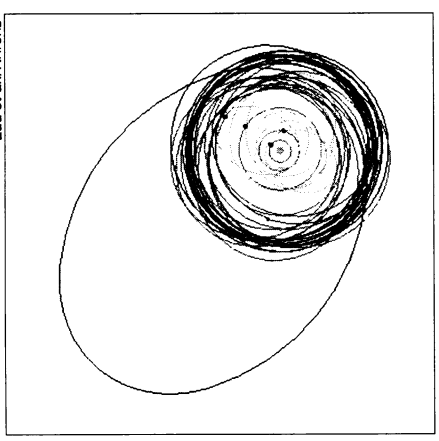
Follow-up observations reveal, however, that 1996 TL_{66} belongs to a new class of objects that roam a no-man's-land. It follows a highly elliptical orbit that takes it far deeper into the reaches of the outer solar system than any of the 36 or so known denizens of the Kuiper belt. In fact, the body ventures as far away as 130 astronomical units (AU), or 130 times the distance from Earth to the sun. That's more than twice as far as the most extensively studied residents of the Kuiper belt, yet not nearly as far as another proposed storehouse of comets, the Oort cloud, estimated to reside at 50,000 AU (SN: 6/7/97, p. 352).

Luu, of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass., and her collaborators suggest in the June 5 NATURE that 1996 TL_{66} is only the tip of the iceberg. They estimate that 800 frozen bodies of similar size litter this uncharted region of the outer solar system. "We had no idea what kind of objects were in this region until 1996 TL_{66} came along," says Luu.

For now, the total mass of this mysterious population, as well as its origin, is a matter of debate. One intriguing possibility comes from computer simulations by Martin J. Duncan of Queen's University in Kingston, Ontario, and Harold F. Levison of the Southwest Research Institute in Boulder, Colo. They traced the evolution of a group of planetary wanna-bes—frozen objects in the early solar system that were potential building material for Uranus and Neptune but were instead hurled outward. The researchers report in the June 13 SCIENCE that 1 percent of these objects could have survived and should reside in the kind of orbit typified by 1996 TL_{66} and another object, 1996 RQ_{20}, recently discovered by a team led by Eleanore F. Helin of NASA's Jet Propulsion Laboratory in Pasadena, Calif.

Such objects, says Duncan, were intimate partners in the dance of planetary formation and may reveal much more about the origin of planets than members of the Kuiper belt, thought to have remained aloof from such activity.

The new population of objects may merit another distinction, say Duncan and Levison. The unstable orbits of these bodies could allow them to migrate relatively easily into the inner solar system, where they would become short-period comets, orbiting the sun every 200 years or less. In the standard picture, the Kuiper belt supplies such comets, despite the stability of orbits in that reservoir. —*R. Cowen*



Luu *et al.*/NATURE

The elliptical orbit of 1996 TL_{66} extends far beyond those of the best-documented objects in the Kuiper belt, depicted by the dense band of nearly circular orbits. The four innermost orbits are those of Neptune, Uranus, Saturn, and Jupiter.

Unclogging arteries? Radiation helps

Radiation therapy is not just for cancer anymore. A new study offers evidence that one-shot artery irradiation dramatically decreases the chance that newly unclogged vessels will become congested again.

Each year, U.S. cardiologists perform more than 500,000 angioplasties to open dangerously clogged arteries. For roughly half of the patients, however, this balloon-inflation surgical procedure fails to bring lasting relief, eventually requiring surgeons to go back and perform a more invasive and costly arterial bypass operation.

Angioplasty failures generally trace to two problems. Either the vessel "recoils"—collapses and constricts—or injury to the vessel wall causes an overzealous healing response that results in an excessive buildup of smooth muscle cells. In either case, the artery suffers restenosis, or narrowing to the point where healthy blood flow is again impaired. Chest pains and even a heart attack can ensue.

To counter the first problem, cardiologists frequently insert a metal lattice, or stent, to prop open the newly unclogged artery. However, the stent itself can promote an overproliferation of smooth muscle.

Clinicians at the Scripps Clinic and Research Foundation in La Jolla, Calif., now report substantially cutting the risk of such an overproliferation.

They performed an angioplasty on 55 restenosis patients, giving each a stent. They then threaded a ribbon containing metal seeds through the just-treated artery and let it remain there for 30 to 40 minutes. Half of the ribbons contained gamma-ray-emitting iridium-92 seeds; the other half held nonradioactive pellets. The surgeons didn't know which patients were receiving the therapeutic iridium.

Ordinarily, any restenosis takes place within 6 months. Indeed, in the Scripps study, 54 percent of the nonirradiated patients showed restenosis in their treated arteries within that time. In contrast, only 17 percent of the irradiated patients suffered a similar narrowing of their treated arteries. Cardiologist Paul S. Teirstein and his coworkers report their findings in the June 12 NEW ENGLAND JOURNAL OF MEDICINE.

This relatively low-cost irradiation "is one of the first things to come along that seems to do anything about restenosis," says Howard I. Amols, a medical physicist at Columbia University whose team pioneered much of the animal work on which the Scripps study was based.

The new findings "certainly look interesting," agrees cardiologist Stephen E. Epstein of the National Heart, Lung, and Blood Institute in Bethesda, Md. The radiation appears "to reduce that proliferative response of smooth muscle cells by making them incapable of responding to [angioplasty or stenting] injury."

However, he and Amols caution, it's still too early to tell whether radiation prevents or merely delays restenosis. The scientists also suggested that other types of radiation, such as beta particles, might provide a greater margin of safety for treated vessels, nearby healthy tissue, and operating-room staff. —*J. Raloff*