

## Repulsive force in the cosmos?

Not only will the universe expand forever, it will do so at an ever-increasing rate. That's the consensus of a group of astronomers who deduced the acceleration after examining a class of exploded stars known as type Ia supernovas.

In the simplest view of the cosmos, a balance exists between the pull of gravity and the expansion that has taken place ever since the Big Bang, the explosive growth spurt that astronomers believe marked the birth of the cosmos. If the density of matter in the cosmos is above a certain critical value, gravity will win out and the expansion will eventually halt. If the density is less, the universe will keep expanding.

The study indicates not only that the universe has a low density, but that some mysterious force is hastening the expansion. That force might be the basis for the cosmological constant, an antigravity term now in vogue (SN: 2/28/98, p. 139).

Adam Reiss of the University of California, Berkeley and his colleagues base their puzzling findings on a survey of 16 distant type Ia supernovas. Because these supernovas have roughly the same intrinsic luminosity, their apparent brightness indicates their distance from Earth. The team also measured the supernovas' recession velocity, which reflects the expansion of the cosmos when it was one-third to one-half its current age.

Reiss says his team was stunned to find that the cosmos was expanding 10 to 15 percent more slowly in the past than can be accounted for without a cosmological constant. That conclusion, reported last month at a meeting in Marina del Rey, Calif., is consistent with previous findings (SN: 1/3/98, p. 4).

If the recent studies prove correct, "this is certainly one of the most profound discoveries" since that of the radiation left


over from the Big Bang, says Michael S. Turner of the University of Chicago and the Fermi National Accelerator Facility in Batavia, Ill. —R.C.

## Near-Earth asteroid : A far miss

Improved calculations indicate that the asteroid which grabbed headlines last week has "zero probability" of striking Earth when it passes closest to our planet 30 years from now. Moreover, the asteroid 1997 XF11 will probably come no closer to Earth than 950,000 kilometers, nearly three times the moon's average distance, announced Paul Chodas and Donald K. Yeomans of NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif., on March 12.

An estimate reported just a day earlier, based on fewer observations, had placed the 1.6-km-wide body as coming uncomfortably close to Earth—within 48,000 km—on Oct. 26, 2028. That's considerably nearer than has been predicted for the orbit of any asteroid of similar size. On the basis of the updated information, the chance of a collision is indeed zero, agrees Brian G. Marsden of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. He reported his initial and revised estimates in the March 11 and 12 circulars of the International Astronomical Union.

The newer calculations take into account recently uncovered images containing the asteroid taken in March 1990 by Eleanor Francis Helin of JPL and her colleagues, well before the asteroid was reported late last year. Shortly after researchers at the University of Arizona's Spacewatch program first spied the body on Dec. 6, 1997, and well before the detailed calculations of its future orbits, the asteroid's relatively large size and near-Earth orbit prompted astronomers to place it on a list of potentially hazardous objects. —R.C.

**NEW ADDRESS?** 

Whenever you write to us about your subscription, please enclose a SCIENCE NEWS address label to ensure prompt service.

**Change of address:** Please let us know about your change of address 4 to 6 weeks before you move.

**Subscription rates:**

1 year \$49.50    2 years \$88.00

Payment enclosed    Bill me later

(foreign postage \$6.00 additional per year.)

**NEW ADDRESS:**

name (please print) \_\_\_\_\_

address \_\_\_\_\_

city \_\_\_\_\_ state \_\_\_\_\_ zip code \_\_\_\_\_

Attach **OLD** label or print **OLD** address

name (please print) \_\_\_\_\_

address \_\_\_\_\_

city \_\_\_\_\_ state \_\_\_\_\_ zip code \_\_\_\_\_

A128

**Expand your universe with the revolutionary Meade® ETX™ Telescope**

Observe land, sea or sky in stunning high-resolution detail with the world's largest-selling modern telescope.



Explore hidden corners of the universe with the Meade ETX. As *Sky & Telescope* reported, "The Cassini Division in Saturn's rings popped into view...I could see every wisp of velvet on the antlers of a deer 50 feet away...the ETX [is] an ideal all-purpose telescope for anyone wanting to inspect eagles at 100 yards or stars at 100 light-years...a compact, portable telescope with first-class optics." The Meade ETX: there's no other telescope like it in the world.

See it now at any of over 1000 Meade dealer locations in the U.S.A. and Canada, including

**THE NATURE COMPANY**

Call Discovery Channel Stores/The Nature Company at 1-800-367-6178 for the store nearest you. Call Meade Instruments at 1-800-62-MEADE for a free copy of Meade Telescope Catalog #131 or for other dealer locations; or write or fax to Meade Instruments Corp., 6001 Oak Canyon, Irvine, CA 92620. FAX: (714) 451-1460. [www.meade.com](http://www.meade.com) ETX Telescope: \$595; shown with optional camera adapter. Other premium-quality Meade telescopes from \$100 complete.

