

Red glimmer reveals most distant galaxy

Astronomers have glimpsed a galaxy so far from Earth that it ranks as the most distant object in the known universe.

Researchers found the collection of stars by detecting light that left it more than 12.2 billion years ago—only 820 million years after the universe formed, according to some estimates. The team of observational astronomers will report the findings in May in the *ASTROPHYSICAL JOURNAL LETTERS*.

Astronomers have been searching for primordial galaxies for the last 20 or 30 years, says theorist David N. Spergel of Princeton University (SN: 2/7/98, p. 92). Observing galaxies formed so soon after the birth of the cosmos will help researchers figure out how these clusters, including our own Milky Way, evolved.

"The most important science facing astronomers today is how galaxies formed. At the moment, there are lots of theories but no observations to constrain any of these theories," says team member Arjun Dey of Johns Hopkins University in Baltimore, Md.

Dey collaborated with researchers from the University of California, Berkeley and the W.M. Keck Observatory on Hawaii's Mauna Kea.

Although astronomers spotted another juvenile galaxy last year, the newly

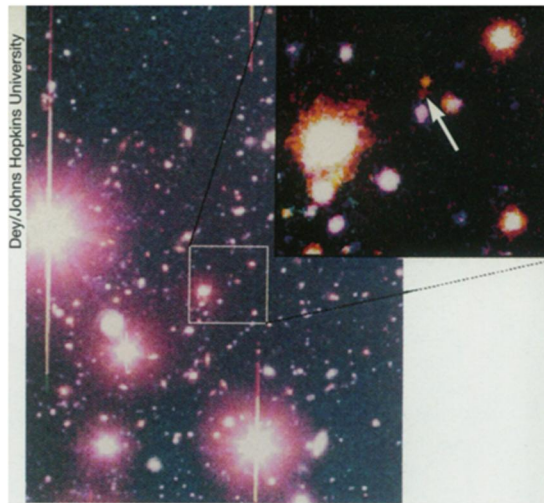
observed one, 0140+326RD1—or RD1 for short—is the first found beyond what they refer to as redshift 5.

As the universe expands, light from distant objects is shifted to longer, or redder, wavelengths. The phenomenon is similar to the way in which the sound of a police siren changes pitch as a squad car speeds away. Astronomers use the degree to which a celestial object's light has redshifted to calculate distance. The redder the light, the farther the object is from Earth. Thus, redshift 5 indicates that the expanding universe stretched an object's light by a factor of 5.

Going beyond redshift 5 represented both a psychological and technological barrier, Dey says. "It's not necessarily such a huge gain in look-back time, but 5 was thought of as one of the earliest epochs in which galaxies might form."

The latest generation of telescopes, such as the Keck telescopes in Hawaii, has made the search easier. Even so, the discovery of RD1 was an accident. Dey and his team were using the Keck II telescope to study an area of the sky where other astronomers had found objects with redshifts not much beyond 4.

"But right next to them was another object that had escaped our original detection because it was very faint," Dey



False-color images of the most distant known galaxy (arrow).

says. Just an edge of the fuzzy blob appeared in their field of view, he adds.

Those first observations were made in September 1997, but the scientists didn't realize then that the blob was the most distant object known, says team member Hyron Spinrad of the University of California, Berkeley. By January 1998, the group had homed in on RD1 and confirmed that it has a redshift of 5.34.

Although the team needs more data to be certain, RD1 may be "our best candidate so far" for a galaxy just beginning to make stars, says Dey. —M.N. Jensen

All age groups lack vitamin D in blood

While calcium is a hot seller these days, its partner in physiology, vitamin D, has been largely neglected. The body needs vitamin D to absorb calcium, but since people can get the vitamin from sunlight and various foods fortified with it, most of them assume they get enough.

Unfortunately, they're often wrong—and the consequences can affect them right down to the bone.

Previous research on vitamin D has focused primarily on elderly people, who face a serious risk from a deficiency. Now, a Massachusetts team reports that younger people often lack sufficient amounts as well. This deficiency has been linked to osteoporosis, or brittle bone disease, because the body extracts calcium from bone when it doesn't have enough vitamin D on hand to absorb adequate calcium from food.

Researchers tested blood samples taken from a total of 290 consecutive patients arriving at Massachusetts General Hospital during March and September 1994. Fifty-seven percent had insufficient vitamin D, report Joel S. Finkelstein of Harvard Medical School and Massachusetts General Hospital in Boston and his colleagues in the March 19 *NEW ENGLAND JOURNAL OF MEDICINE*.

Most housebound people and people over age 65 were found deficient, a result that mirrors past studies. Elderly people tend to lack vitamin D in their diets and get outside less often than younger people.

Surprisingly, 42 percent of the 77 healthy, nonelderly people tested also showed a deficiency. These people, whose age averaged 44, had come to the hospital with complaints, such as chest pains, that turned out not to stem from medical problems.

Since thinning bone isn't apparent until a fracture occurs, these younger people wouldn't notice any effects of vitamin D deficiency, says Michael Parfitt of the University of Arkansas for Medical Sciences in Little Rock.

The researchers took blood samples at two times of year in order to explore the effect of sunlight. In March, nearly two-thirds of the people tested were deficient in vitamin D. In September, half lacked a proper amount.

The Institute of Medicine's Food and Nutrition Board recommends 200 International Units (IUs) of vitamin D daily for people age 19 to 50 and more for older folks. Multivitamin pills typically contain at least 400 IUs, yet nearly half of the 54 people in the study who reported

taking multivitamins daily were deficient in vitamin D, as determined by measurements of 25-hydroxyvitamin D, a hormone derived from the vitamin. "We can't tell you why so many people are deficient," says Finkelstein.

The study raises the possibility that recommended intakes of vitamin D are too low, even though they were raised just last year, says endocrinologist Robert D. Utiger in an editorial accompanying the report. Milk, infant formula, and some margarines and cereals are fortified with vitamin D, but the amounts are inconsistent. "Fortification of other foods should be considered," Utiger suggests.

Whether people should be screened for vitamin D deficiency or advised to take more vitamin D is still an open question, says Harvard endocrinologist and study coauthor Melissa K. Thomas.

The researchers used a conservative measure of vitamin D deficiency, says Bess Dawson-Hughes, an endocrinologist at the U.S. Department of Agriculture Nutrition Center at Tufts University in Boston. They chose as a minimum safe concentration 15 nanograms of 25-hydroxyvitamin D per milliliter of blood serum. Even people with 25 to 30 nanograms per milliliter could be mildly deficient, Dawson-Hughes says. "The magnitude of the problem is substantial." —N. Seppa