ASTRONOMY

Stars in Milky Way

The stars in the center of the earth's galaxy, the Milky Way, are now believed to be cooler and not of the same general class as those in its halo.

➤ THE STARS in the Milky Way's center are not of the same general class as those in its halo, an astronomer told the National Academy of Sciences meeting in Berkeley.

Dr. W. W. Morgan of the University of Chicago said his studies also suggested the stars in the Milky Way nucleus were not of the same general class as those in the nucleus of the Andromeda Nebula. Both these findings differ from current thought among astronomers concerning the stellar make-up of galaxies.

The Milky Way is the gigantic pinwheel of billions of stars in which the sun and its planets, including earth, are located. The Andromeda Nebula is considered like a twin sister galaxy to the Milky Way. It is also a spiral system with billions of stars, thought to have a form and constitution similar to the Milky Way's.

Dr. Morgan bases his suggestions on studies made by spectroscope of the starlight from four regions near the center of the Milky Way. These indicate the main contributors to the light in the nuclear region are stars like the sun or cooler ones.

When these spectrograms are compared with those of light from globular clusters in the halo surrounding the Milky Way, he finds differences in general stellar class.

When they are compared with spectrograms of the nuclear region of the Andromeda Nebula, Dr. Morgan believes they show a "probable large-scale structural difference" between Andromeda and the Milky Way, even though the two galaxies are believed similar.

Distances to Stars

➤ A NEW METHOD of telling distances to stars, a fundamental problem of astronomy, was reported to the Academy.

Dr. O. C. Wilson of Mount Wilson and Palomar Observatories, Pasadena, said the method was being further investigated to determine exactly how accurately it measures distances. It applies to stars similar to or cooler than the sun.

The method is based on the widths of bright reversed lines found at the centers of certain wide, dark lines of calcium when the star's light is spread out by spectroscope into its many rainbow colors. The widths of these emission features are related to the absolute luminosities of stars from the supergiants to certain dwarf stars.

The observed brightness of a star depends both on its absolute luminosity and its distance, thus a star's distance can be found if its absolute luminosity is known.

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ENGINEERING

Radar Antenna Scans

➤ A RADAR antenna that scans throughout a complete circle without any motion of the antenna structure itself has been fashioned out of 50 yards of drapery material from a local department store.

Known as a Helisphere, it was developed by Eugene Kadak and James M. Flaherty of the Westinghouse Research Laboratories, Pittsburgh.

The antenna is a sphere, either inflated or of rigid construction. Imbedded in its surface are narrow metal conducting strips wound around the sphere in a spiral or helix pattern.

Operation of the antenna is based on the observation that radar waves can be polarized, or made to vibrate back and forth in a single plane. The polarized waves are sprayed against the inside surface of the sphere so that they vibrate parallel to the conducting strips. In this position the surface reflects the waves back to the other side of the sphere. On this side, due to the helix pattern, the conducting strips are at right angles to the reflected radar waves. Thus, the waves pass through the strips and continue on into space as a narrow radar beam.

Experimental versions of the Helisphere included both rigid and inflated models, with the latter offering the additional advantages of being light, portable and easily erected. The demonstration model, shown in the photograph, was made with drapery material that had decorative metallic threads woven into the fabric.

Westinghouse scientists believe Helisphere is so effective a concentrator of high-frequency radar waves that it will have definite application as an antenna for powerful, long-range, anti-missile radars.

Its non-rotating design permits faster scanning and track rates than conventional antennas that rotate continually, and eliminates the need for driving power. By substituting motion of the radar energy source for antenna motion the antenna construction is simplified and the problem of rotating bearings is done away with.

The demonstration model is six feet in diameter and works on wavelengths of a little more than an inch in length. A full-scale Helisphere, it is estimated, would be about 100 feet in diameter and would employ wavelengths of about one foot in length.

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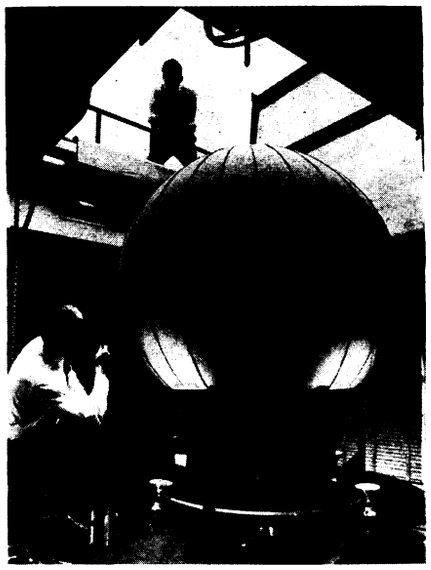

HELISPHERE—A six-foot model of the Helisphere, a new kind of radar antenna, is ready to emerge through the roof of the Westinghouse Research Laboratories as scientists Eugene Kadak and James M. Flaherty stand by.

ASTRONOMY

Universe Age Now Jibes With Radioactive Dating

➤ THE UNIVERSE is from seven to 13 billion years old, a cosmic age that jibes for the first time with that from radioactive dating.

The latest estimates of the universe's birth time result from studies made with the giant 200-inch Hale telescope atop Mt. Palomar, Calif. The world's biggest "eye" this year begins its second decade helping man understand the vast complexities of space. (See p. 310.)

Within the next five years, Palomar astronomers hope to complete the colossal task of finding out the size of the observable universe and how much matter it contains. They will also try to learn whether the expanding universe shows signs of slowing down at the limits of observable space.

Achieving these objectives is believed possible because of the new accuracy being developed in the "yardsticks" that measure the enormous distances in space, Dr. Ira S. Bowen, director of Mount Wilson and Palomar Observatories, said. The Observatories are operated jointly by the Carnegie Institution of Washington and California Institute of Technology.

Dr. Allan R. Sandage of the Observatories' staff said the large variation in the estimated age of the universe is due to uncertainties that still exist in the measurements. The figures are significant, however, because for the first time they are consistent with the age set by geologists based on the decay of radioactive elements in rocks and meteorites.

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