RADIO ASTRONOMY

Radio Astronomy Studies

International gathering of scientists in Washington discusses latest techniques for, and information learned from, studying the heavens by means of radio waves instead of light.

➤ FOR THE first time, astronomers are getting a picture of the center of the great spinning "pinwheel" of stars that make up the Milky Way galaxy to which the sun and the earth belong.

At an international conference on radio astronomy in Washington, Dr. H. C. van de Hulst of Leiden Observatory, the Netherlands, revealed studies made during the last two months that indicate the structure of our galaxy toward the center. Using radio waves sent out by the very sparse hydrogen gas that fills the space between the stars, he has started to chart the inner parts of the galaxy.

Our Milky Way galaxy is believed to resemble the Andromeda nebula, the only external galaxy easily seen as a hazy patch with the unaided eye, and now visible in the northwestern sky. Because the entire Andromeda galaxy can be seen from the earth, astronomers have a much better idea of its structure than they do of the Milky Way's form.

The sun is located in one of the arms of our galaxy, and being thus off to one side makes seeing the structure of our galaxy with light waves extremely difficult.

However, using the new technique of radio astronomy, scientists were first able to detect the Milky Way's spiral arms, and now they are finding its form toward the center.

Nearly ten years ago Dr. van de Hulst predicted that neutral hydrogen in interstellar space ought to emit energy of 21 centimeters wavelength, which could be picked up with delicate radio equipment. By charting the pattern of distribution of the hydrogen gas between the stars, he and his co-workers at Leiden Observatory hope to get a clearer picture of how our Milky Way is put together.

The sun, he has found, is 8.2 kiloparsecs from the center of the galaxy, or about 160,000,000,000,000,000 miles. In a direction slightly away from center, his studies have shown two wrappings around the center, one at about two kiloparsecs and one at about 13 kiloparsecs.

Science News Letter, January 23, 1954

RADIO ASTRONOMY

Sun Throws Out Particles At One-Fifth Light Speed

➤ OUR SUN is throwing off particles at speeds up to one-fifth that of light, or 37,000 miles a second. The first direct evidence that the sun can eject cosmic-ray type particles at the time of major flare-ups was found by Paul Wild of the radiophysics division of the Commonwealth Scientific and Industrial Research Organization in Sydney, Australia.

Cosmic rays are highly energetic particles continuously bombarding the earth from space. Where they come from and how they get their tremendous energies are still mysteries, but Mr. Wild's work has resulted in the most definite clue so far.

"If a quiet, innocuous star like the sun can speed up particles to one-fifth or one-tenth the velocity of light all of a sudden, what can the monster star do? Very active stars would be throwing off such particles all the time," Dr. E. G. Bowen, director of the radiophysics division, said in Washington in explaining Mr. Wild's work.

Most methods so far suggested to account for the high speeds of cosmic rays require that the particles have an "injection" velocity about one-tenth that of light. Since Mr. Wild reports he has actually measured particles ejected from the sun at even higher velocities, the problem of the origin and very high energies of cosmic rays may have been solved.

To make his observations, Mr. Wild used new equipment put into operation in the past two months. Instead of light, he uses radio waves to search the sun and its surrounding area. With the improved equipment, he found "noise" — which sounds somewhat like static on an ordinary radio— caused by particles thrown off by the sun. By tracing the path of these noise-producing particles, Mr. Wild fixes their outward speeding from the sun at up to 37,000 miles a second.

His new set-up searches for radio waves at frequencies of from 40 to 240 megacycles per second ten times during each second.

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RADIO ASTRONOMY

Search for Radio Waves Of H-Bomb Element

➤ A SEARCH for the H-bomb element deuterium in the vast spaces between the stars will be made this spring, Dr. H. I. Ewen of Harvard College Observatory revealed at the conference.

Although the expected amount of deuterium in interstellar space is extremely minute and could have no practical value on earth, Dr. Ewen believes that hydrogen's heavy twin will signal its presence by radio waves. The equipment he is now building should be sensitive enough to pick up the 327 megacycle deuterium radiation from the sky.

Dr. Ewen also described an improvement in equipment now being used to observe the radio waves from hydrogen in interstellar space with Harvard's radio telescope. With it, Dr. Ewen has been able to speed up the radio wave observations so that in two months, work scheduled to take one year has been completed.

Using the new equipment, Edward Lilly and David Heeshan have been able in 15 minutes to make tracings of the distribution of interstellar hydrogen that previously took six hours.

Science News Letter, January 23, 1954

RADIO ASTRONOMY

Confirm Positions of Hissing Radio "Stars"

➤ POSITIONS ON about a dozen of the radio "stars" hissing at us from the heavens have been confirmed since New Year's Day with the new radio telescope at Ohio State University, Dr. J. D. Kraus reported.

The instrument, twice as large as its predecessor, has 96 antennae, each in the form of a helix, or spiral. It was first put in operation on the evening of Jan. 1. Before the year is out, Dr. Kraus predicted, the new instrument will have spotted several as yet undiscovered sources of radio radiation in the sky.

Science News Letter, January 23, 1954

RADIO ASTRONOMY

Electrons May Cause Radio Waves from Space

➤ ELECTRONS MAY cause some of the radio waves received on earth as hisses from the heavens, Dr. Fred Hoyle of Cambridge University, England, told the conference on radio astronomy.

"The discovery that strong radio emission regions seem always to be connected with places were there are very high internal motions" of the great gas clouds sometimes seen as stars led him to this conclusion, Dr. Hoyle said.

In trying to explain the cause of the radio waves picked up by giant metal "dishes" aimed at the sky, astronomers had previously dismissed the electron, believing it could not play a major part. The electron is the smallest known particle having a negative charge.

However, using new facts learned within the last year about radio sources, Dr. Hoyle has now concluded that electrons could cause sufficient radiation if there was a strong magnetic field and if the nebulous matter was in turbulent motion.

Investigation of invisible radiations in the radio range coming from the sky is an especially promising new method of attacking astronomical problems.

About 50 astronomers and radio engineers from all over the world attended the three-day conference, sponsored by the National Science Foundation, the Carnegie Institution of Washington and the California Institute of Technology.

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