astronomy

X-RAY

Radiation from the galaxy

Rocketborne observations of the last few years have shown that space is pervaded with a diffuse background radiation in the X-ray range from 250 electron volts to above a million electron volts. Several observers have suggested that the source of this radiation is extragalactic because it comes with equal strength from all directions, and the possible diffuse X-ray sources within the galaxy are by no means so evenly distributed.

Now Drs. B. A. Cooke, R. E. Griffiths and K. A. Pounds of the University of Leicester in England report a new sky survey that shows that this background is slightly stronger in the directions of the constellations Vela, Carina and Lupus. Since there are no known discrete sources of X-rays in that area, the English astronomers suggest, in the Oct. 11 NATURE, that the enhancement may represent a diffuse contribution from the galaxy.

Possible generating mechanisms they suggest include collisions between cosmic ray protons and galactic electrons and collisions between the electrons and light, radio or infrared radiation from other sources.

PULSARS

Clocking the slowdown mechanism

"Pulsars have extended our horizon for precision time measurements to galactic distances," write Drs. P. E. Boynton, E. J. Groth, III, R. B. Partridge and David T. Wilkinson of Princeton University in the September ASTROPHYSICAL LETTERS. The measurements, they say, already throw interesting light on the mechanism that is slowing the pulsar's rotation.

The astronomers have embarked on a long-term study that compares the pulses of the Crab nebula pulsar, NP 0532, with the vibrations of a cesium atomic clock.

There is a formula that relates the rate of the pulsar's slowdown to the different possibilities for a braking mechanism, and it may be used to determine whether the drag of a plasma wind, loss of energy to magnetic radiation or loss of energy to gravitational radiation may be responsible. When these figures are fed into the formula, say the Princeton astronomers, the result seems consistent only with braking by gravitational radiation. They measured the period of the pulsar to within less than four trillionths (4×10^{-12}) of a second, and the increase to within five ten-trillionths (5×10^{-13}) of a second per day.

EQUIPMENT

New Southern telescope

The Carnegie Institution of Washington has announced that the first telescope to be built at its Carnegie Southern Observatory will be a 40-inch reflector. The telescope will stand at an 8,000-foot elevation on top of Las Campanas mountain in north central Chile.

The Carnegie Southern Observatory will be built and operated by the Mt. Wilson and Palomar Observatories, which are operated by the Carnegie Institution and the California Institute of Technology. Eventually there will be a 200-inch reflector at the Chilean station.

The 40-inch telescope is expected to be in operation by the end of 1970. As soon as it is ready, it will be put to work on two programs. One of these is the optical identification of X-ray stars; the other is a study of stellar evolution that will compare stars in the Magellanic Clouds with similar stars in our own galaxy.

SELENOGRAPHY

Uranium abundance

According to a suggestion made in 1966, the radioactive gases radon and thoron should be present near the surface of the moon in detectable amounts if the concentration of uranium 238 in the moon's outer crust were anything like the earth's. The detection could be accomplished by having lunar orbiting satellites record alpha particles given off by the radioactive gases.

Drs. Richard S. Yeh and James A. Van Allen of the University of Iowa have done such an experiment with Explorer 35. They report, in the Oct. 17 SCIENCE, that it is unlikely that the moon emits as much as one-tenth of the suggested alpha radiation. Thus they say it has probably nowhere near the uranium concentration of the earth's lithosphere, though it could have the abundance of uranium 238 that is found in terrestrial basalt or in chondritic meteorites.

PLANETARY

Carbon monoxide on Mars

Between March 25 and May 13, 1967, near infrared spectra were taken of the planet Mars to form part of an atlas of planetary infrared spectra that has just been published. Study of the Mars spectra shows evidence of carbon monoxide in the Martian atmosphere, report Drs. L. D. Kaplan of the Jet Propulsion Laboratory in Pasadena, Calif., and the University of Paris, J. Connes of the Meudon Observatory in France and Pierre Connes of the Laboratoire Aimé Cotton at Orsay, France.

They write in ASTROPHYSICAL LETTERS for September that they find spectral lines of the most common isotope of carbon monoxide, made with oxygen 16 and carbon 12, as well as rarer ones like carbon 13-oxygen 16 and carbon 12-oxygen 18. The common isotope, they say, represents 0.08 percent by volume of the Martian atmosphere. Lines of the other isotopes, though definitely visible, were too weak to estimate abundances.

PULSARS

Wobbling like a top

In the pulsars AP 2015 + 28 and CP 1919 a second periodic pulsation has been discovered that has a different period from the main one. Such a second pulsation may also exist in others and astronomers suggest it may be common to tell pulsars.

Though some would attribute the second pulses to pulsations of the pulsar body, Dr. Samuel C. Vila of the Institute for Space Studies in New York proposes in the Oct. 11 NATURE that as the first pulse is caused by rotation, so the second is caused by precession of the rotation axis, a motion like the wobble of a top.