astronomy

Interfering in the infrared

Interferometry, the combination of signals received at different points to get resolution unobtainable with a single point of reception, has a long and fruitful history in both optical and radio astronomy. Now it is beginning to be applied in the infrared.

What makes it possible, Jean Gay and Alain Journet of the Observatoire de Paris at Meudon, France, report in the Jan. 8 NATURE PHYSICAL SCIENCE is the recent availability of infrared detectors fast enough to be used as signal mixers. Gay and Journet built an infrared interferometer with which they were able to resolve the diameter of the sun (about 31 minutes, 40 seconds of arc in August, when the measurement was made) with infrared of wavelength 10.6 microns. The size of the detectors is 200 microns, and this permitted the experimenters to vary the baseline of the interferometer between 0.5 and 1.5 millimeters.

Because of the favorable signal-to-noise ratio, Gay and Journet believe that infrared interferometry will be an attractive technique. They foresee application to "very-long-baseline interferometry" with distances between receivers of 100 to 1,000 meters.

X-ray pulses from Vela pulsar

Equipment flown on an Aerobee rocket from White Sands Missile Range in New Mexico to do an X-ray survey of the constellations Vela and Puppis found soft X-ray pulses coming from the pulsar in the supernova remnant in Vela. F. R. Harnden Jr. and Paul Gorenstein of American Science and Engineering in Cambridge, Mass., report in the Jan. 12 NATURE that the soft X-ray pulsations have the same period as the radio pulses but come at different times. Harnden and Gorenstein suggest that there may be two pulses in the pulsar, a main pulse strong in radio but weak in X-ray and an interpulse strong in X-ray but weak in radio.

The X-ray data strengthen the case for the pulsar as a point source of X-rays, the two observers say. "This should remove any residual doubt about its intimate connection with the Vela supernova remnant." In spite of diligent search no visible light from the pulsar (PSR 0833-45) has ever been found. This, according to Harnden and Gorenstein, favors a model like that of Peter Sturrock: A neutron star rotating at only one-third the speed of the one in the Crab pulsar is still a strong source of X-rays, but emits no visible light.

More on redshift problems

For a number of reasons some astronomers are unwilling to believe that the redshifts in the light received from certain quasars are entirely due to the quasars' velocity of recession (SN: 1/20/73, p. 46). There is thus interest in finding out other mechanisms that could contribute to redshifts. One that has been suggested is an interaction between the quasar light and a background field of electromagnetic radiation, namely, the three-degree blackbody background.

In the Jan. 12 NATURE R. L. Cohen and G. K. Wertheim of Bell Telephone Laboratories in Murray Hill, N.J., throw cold water on this idea. Their calculations indicate that such an interaction would produce a shift of only 10^{-33} waves per centimeter. To explain the redshifts it would have to produce 10^{-30}.