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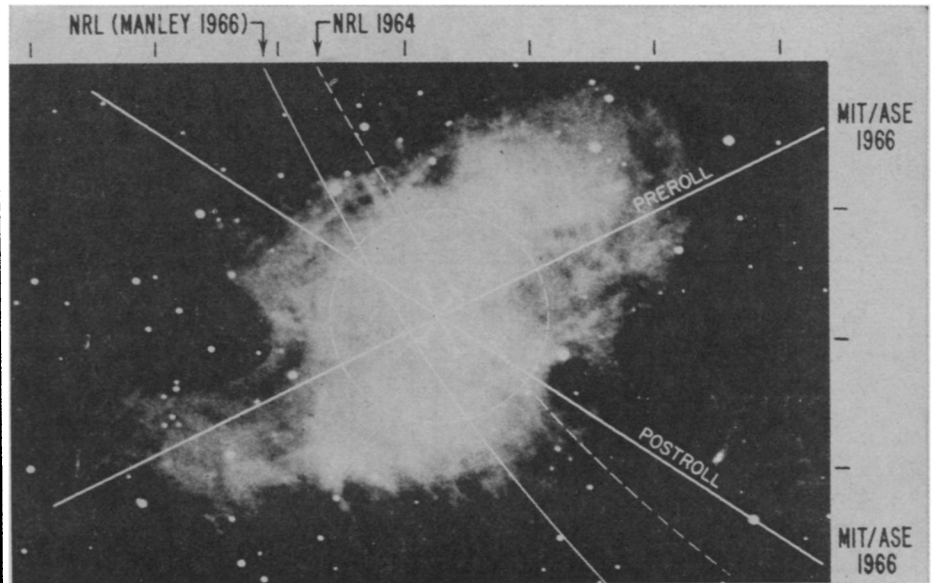
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## ASTROPHYSICS

# Crab Nebula in X-Rays

Rocket data indicate a common distribution for both light and X-rays from the Crab Nebula.



MIT/ASE 1966

Crab Nebula with superimposed diagram of X-ray source, idealized in circle.

The size and position of the first source of X-rays from the sky positively identified—the Crab Nebula—have now been charted to a high degree of accuracy using data gathered during an Aerobee rocket flight.

The X-ray and visible light from the Crab Nebula, the spectacular heavenly "firecracker" that exploded as a supernova on July 4, 1054, have a common center. The two types of radiation may even have an identical distribution.

This finding, if confirmed, would have an important bearing on theories concerning the origin of the X-ray emission, still a puzzle to astronomers.

The first determination of the Crab Nebula X-ray source was made in 1964 when Naval Research Laboratory scientists measured how the radiation was cut off as the Crab passed behind the moon. These observations showed qualitatively that the radiation came from an extended region and was not a point source as some had thought.

The new measurements not only give the position of the center more accurately but show that the center is coincident with both the optical and radio emissions. This allows the theoreticians to assume that the optical and X-ray radiation have the same origin, removing a problem that had been bother-

some when the two were thought to be off-center from each other, indicating two different mechanisms.

What scientists would like to do now is to chart the brightness distribution of the X-ray radiation within the Crab Nebula. They hope this can be done within the next two or three years either from rockets or a satellite.

Details of the new observations are being reported in the April ASTROPHYSICAL JOURNAL by a team of scientists from Massachusetts Institute of Technology and American Science and Engineering, Cambridge, Mass., led by Dr. Minoru Oda and Dr. Herbert Gursky, respectively.

The accompanying diagram-photograph shows the position of the X-ray source in the Crab Nebula superimposed on an optical picture.

The broken curved line is the position obtained when the Crab's X-ray radiation was occulted by the moon in 1964. The solid curved line is the same result, corrected to indicate how the rocket's motion affected the apparent position of the moon.

The intersection of the two lines passing through the circle of the illustration indicate the center of the source, which is at right ascension 5 hours, 31 minutes, 30 seconds and declination 21 degrees, 59.1 minutes.