



## GAMMA RAYS OBSERVED FROM BALLOONS



*Launching of NRL balloon-borne gamma-ray experiment*

The NCA March speaker will be James D. Kurfess of the U. S. Naval Research Laboratory, Washington, D. C.

The energy-spectral region between 100,000 and 10 million electron volts is of great importance in astrophysics because it contains nearly all nuclear  $\gamma$ -ray transitions and the positron-annihilation spectral line. It also serves as a window for observation of very early epochs in the history of the universe. For these reasons, observations of  $\gamma$ -ray events having energies of the order of 1 mev should expand our knowledge of cosmology, of the location of nucleosynthesis sites, and of catastrophic phenomena in astronomy.

The Naval Research Laboratory now has a program in low-energy  $\gamma$ -ray astronomy that uses balloon-borne, large-area, scintillation detectors; because of the practical difficulties involved, only relatively simple experiments have yet been done. Techniques used and initial results obtained will be described.

Dr. Kurfess obtained his Bachelor's, Master's, and Doctoral degrees, the last in 1967, from Case Institute of Technology, Cleveland, Ohio.

For two years he was associated with the Department of Space Science at Rice University, Houston, Texas, where he participated in X-ray astronomy using high-altitude balloons launched from Palestine, Texas and Mildura, Australia. Dr. Kurfess joined the Space Science Division of NRL in 1969.

### MARCH CALENDAR

Thursday, March 2, 16, 8:30 PM — Neighborhood Astronomy on the observing deck of the Chevy Chase, D. C. Community Center, Connecticut Avenue and McKinley Street, NW. Information: Rene Lamadrid, 585-5569.

Friday, March 3, 10, 17, 24, 31, 7:30 PM — Telescope-making classes at American University, McKinley Hall Basement. Information: Jerry Schnall, 362-8872.

Saturday, March 4, 6:15 PM — Dinner with the speaker at Bassin's Restaurant, 14th Street and Pennsylvania Avenue, NW. No reservations needed.

Saturday, March 4, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. James Kurfess will discuss low-energy  $\gamma$ -ray astronomy.

Monday, March 6, 13, 20, 27, 7:30 PM — Telescope-making classes at the Chevy Chase, D. C. Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

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CALENDAR - continued

Saturday, March 18, 7:00 PM — All-NCA star party at Mr. and Mrs. Jerry Hudson's, Knoxville, Md., about an hour northwest of D. C. Black skies prevail in this rural area. Please bring a light snack (cookies, etc.), and those who can take riders or telescopes, please stop by the Chevy Chase, Maryland Library, 8001 Connecticut Avenue, north of East-West Highway, at 6:00 PM. Information and directions: Jean Radoane, 434-0443.

DRESS WARMLY!

Saturday, March 25, 8:00 PM — NCA Discussion Group meets at the Department of Commerce, second floor, room 2062. Robert Bolster will show slides of his recent trip to Kitt Peak National Observatory and its optical shop. This talk was postponed from February.

NCA FEBRUARY LECTURE

Dr. Sally Heap of the Goddard Space Flight Center's Laboratory for Optical Astronomy discussed research on the central stars of planetary nebulae at the February 5 meeting.

The basic questions the astrophysicist asks about a planetary nebula concern its size, composition, history, and the past history of its central star. The fundamental observational information about the central star is based on its position, luminosity, spectrum, and polarization. We can conclude that a nebula is the sloughed-off shell of a given star because the radial component of the nebula's expansion can be traced back to the central star, an expansion that lasts about 50,000 years before nebulosity invisibility. A typical planetary nebula represents 20 percent of the original star mass. A typical central star has a mass similar to the sun's, but this former nova is hotter than an O star, with a spectrum that defies complete classification. They are more dense than the sun. During 1971, theoretical work strongly established the idea that virtually all stars of solar mass will eventually produce planetary nebulae in the unstable phase ending their red giant stages of evolution. The reason these "old red giants" are hotter than O stars is because we are seeing a part of the star much nearer the core.

A major difficulty in studying central stars of planetaries is that their radiation peaks at wavelengths below 900 Å. Important spectral lines are blocked by interstellar matter even from earth satellites. In general, treatment of the nebula itself as a "photon counter" of the central star is necessary.

FEBRUARY DISCUSSION GROUP

Dick Horwitz gave a memorable slide presentation about the principal buildings at Cape Kennedy and several of the lunar expeditions. Among the buildings at the Cape is one so large that it "rains" inside; some of the lunar slides were the actual film used on the surface of the moon. Views of the earth from the Apollo spacecraft many thousands of miles in space were breathtakingly beautiful.

FOR SALE

Eight-inch Cave Astrola reflector with portable pier, drive, rotating tube, setting circles, and two eyepieces; asking \$445.00. Call 520-1978 evenings.

CHANGE OF ADDRESS

Mr. and Mrs. Jerome Hudson  
Route 2, Knoxville, Maryland 21758  
(301) 432-8386

## NCA GROWS

We welcome the following new members

## Regular

Col. Merritt B. Booth, Jr.  
9901 Mill Run Drive  
Great Falls, Virginia 22066  
759-2071

Miss Isabel Fine, Apt. 303  
4491 MacArthur Boulevard  
Washington, D. C. 20007  
337-3942

Aldo Ferretti  
8516 Howell Road  
Bethesda, Maryland 20034  
469-9624

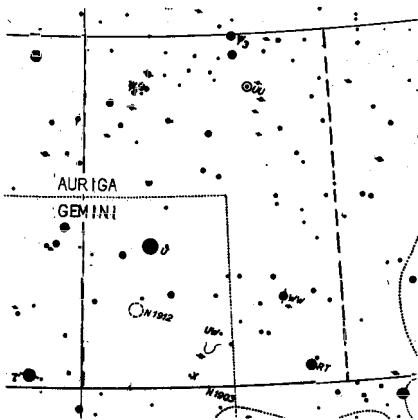
## Junior

Joyce M. Booth  
9901 Mill Run Drive  
Great Falls, Virginia 22066  
759-2071

Victoria M. Ferreti  
8516 Howell Road  
Bethesda, Maryland 20034  
469-9624

## ASSIGNED NCA NOVA PATROL AREA

in the late 1950's, two  $10^{\circ}$  squares of sky, spaced to allow year-round observation, were assigned to NCA by the AAVSO for systematic patrol in hopes of early detection of novae. William Isherwood, who was the observation chairman at the time, made regular reports on these observations for more than a decade. He relates that early in the program a star was detected with binoculars which was not located on readily-available star atlases. After some excitement, however, it was found to be one of the less well-known, normally extremely faint, long-period variables. Binoculars or simple guided camera photography are suitable methods for this sky patrol.



The winter sky patrol area in Auriga-Gemini is shown in the above photograph made by William Winkler on February 11, 1972, at Travilah, Maryland. He used an  $f/3.5$  80 mm lens and a  $4500\text{-}\text{\AA}$  blue filter having a half-power bandwidth of  $1100\text{ \AA}$ , for this 30-min. exposure on Tri-X film.

At left is a chart of the same area, adapted to the same scale from the Skalnate Pleso Atlas. The area is located between right ascension 6h 20m, and 7h, and declination 30 and 40 degrees north.

## 1972 HANDBOOKS AVAILABLE

The *Observer's Handbook*, filled with useful data from the *American Ephemeris* and from other sources, is available for \$2.00 from treasurer Charles Shephard by mail, or at the monthly meeting.

NCA TELESCOPE-MAKING EQUIPMENT MOVED

Starting at 8:30 AM on a rainy Saturday, January 22, NCA telescope-making equipment was moved from storage in the basement of Peter Fiekowski's home to the workshops of the new Chevy Chase Community Center, in preparation for Monday evening classes in mirror making.



Left: Bolster, Legowik, and Schnall unload John's van. Right: The trio survey some of the equipment and parts that had been in storage for about four years. Present also were Winkler, Fiekowski, and some of Fiekowski's friends.

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