

OBSERVATIONS OF NEUTRON STARS PLANNED BY THE HIGH SPEED PHOTOMETER TEAM USING SPACE TELESCOPE

Joseph F. Dolan
NASA Goddard Space Flight Center
Laboratory for Astronomy & Solar Physics
Greenbelt, MD 20771
U. S. A.

The unique capabilities of the High Speed Photometer (HSP) on the Hubble Space Telescope (10 microsecond time resolution; 25 filters covering wavelengths from 1220 to 9000 angstroms; apertures as small as 0.4 arcsec in all filters; no scintillation noise induced by the atmosphere) will be used by the HSP Team to investigate several problems related to the origin and evolution of neutron stars. Among the observational programs planned by the team are:

- a search for pulsations in the ultraviolet from binary systems containing X-ray pulsars. The UV pulsations should arise from reprocessed radiation in the X-ray heated hemisphere of the companion star. Comparisons of the UV period to the X-ray period can yield the mass ratio of the binary.

- monitoring the photometric and polarimetric light curves of X-ray binary systems in the UV. Any variability detected can be related to the orbital parameters and accretion mechanism of the neutron stars.

- a search for the remnant star in supernova remnants. The results will place new constraints upon the mechanisms by which neutron stars can originate.

- optical and UV observations of optically detected radio pulsars (the Crab, Vela, and LMC pulsars) and the attempted detection of other radio pulsars (the millisecond pulsars, two binary pulsars, and the pulsar with the largest measured value of dp/dt).

- monitoring the LMC gamma-ray burst source in N49 in the UV at the zero phase of its periodic optical bursts. The results may confirm that this unusual gamma-ray burst source is a neutron star.

The HSP Investigation Definition Team members are: Principal Investigator Robert C. Bless (University of Wisconsin), Joseph F. Dolan, James L. Elliot (MIT), Edward L. Robinson (University of Texas), G. Wayne van Citters (National Science Foundation) and Richard L. White (Space Telescope Science Institute).