

## **NASA donates \$750,000 to the UCSD Center for Astrophysics and Space Sciences**

**December 8, 1988**

Contact: Yvonne Baskin, (619) 534-3120

### **UCSD CENTER FOR ASTROPHYSICS AND SPACE SCIENCES RECEIVES NASA FUNDING FOR X-RAY ASTRONOMY INSTRUMENT**

The National Aeronautics and Space Administration has awarded another \$750,000 to the University of California, San Diego Center for Astrophysics and Space Sciences to complete five years of planning and definition for an X-ray astronomy instrument to be launched aboard an Explorer satellite in 1994.

Design and construction of the multimillion-dollar instrument--called the UCSD High Energy X-ray Timing Experiment--is scheduled to begin on campus next October, said Richard E. Rothschild, CASS research physicist and principal investigator on the project.

The instrument will be one of three carried by NASA's X-ray Timing Explorer satellite on a two-year mission to study X-ray emissions from extremely compact astrophysical objects such as neutron stars, white dwarfs, black holes and quasars.

More than 1,000 bright X-ray sources in space have been identified and mapped since the early 1960s. XTE will be the first mission dedicated not to finding new X-ray sources but intensely observing the details of known sources. The goal is to learn more about the nature of compact matter; the evolution of star systems containing such objects; and the conditions of cosmic plasmas (ionized gases) subjected to extremes of gravity, magnetic fields and temperature that surround these objects.

"We think these X-ray sources are all binary systems in which one of the objects has evolved to a black hole, a white dwarf or a neutron star," Rothschild said. "This highly condensed matter with its extreme gravitational field is sucking away the gases from the other star, accelerating them to red heat, white heat, then X-ray heat.

"Not only do these systems exhibit strong gravity, but they also have magnetic fields and relativistic phenomena we could never generate on Earth. Superconductivity and superfluids and plasmas of 100 million degrees are also involved. So the mission should also provide new insights about the basic behavior of particles and fields."

The mission could:

- detect the spinning neutron star predicted to have been created by the 1987 supernova explosion
- determine the internal structure of neutron stars
- test predictions of Einstein's theory of general relativity as it relates to black holes

--identify new black holes

--prove whether or not massive black holes are the ultimate power sources for quasars and other active galaxies.

The CASS instrument and a second instrument provided by NASA's Goddard Space Flight Center will make observations over almost the entire X-ray band. The third instrument, to be built at Massachusetts Institute of Technology, will scan the heavens constantly for transient phenomena such as x-ray novae and radical changes in the state of pulsars that the CASS and NASA instruments can then explore.

(December 8, 1988)