

Telescope to hunt black holes reaches orbit

Irene Klotz, Reuters

The Nuclear Spectroscopic Telescope Array, nicknamed NuStar, shot toward orbit aboard a Pegasus XL rocket seconds after being released from an aircraft flying about 40,000 feet over the Pacific Ocean south of the Kwajalein Atoll in the Marshall Islands.

Circling the Earth in orbit, one of the X-ray telescope's initial jobs will be to conduct a sky survey, intended to give astronomers more information about how galaxies formed.

Its technology will later be used to examine galaxy clusters, supernova explosions and certain regions of space where particles are being accelerated close to the speed of light, such as around black holes.

In studying supernovas - the exploded remains of giant stars - scientists will be looking for telltale chemical fingerprints of radioactive titanium.

"There's a whole variety of phenomenon from very extreme neutron stars to remnants of old stellar explosions we haven't discovered yet," said lead scientist Fiona Harrison, with the California Institute of Technology.

Supernovas are an important measuring stick for determining the universe's rate of expansion. Because astronomers believe they give off roughly the same amount of light, measuring their brightness has been used to determine how distant they are, much like how a standard 100-watt light bulb appears dimmer if it is farther away.

"With these observations, we'll get a better idea of the physics of supernova explosions," said NuSTAR project scientist Daniel Stern, with NASA's Jet Propulsion Laboratory in Pasadena, California.

Using NuStar to study high-energy X-rays, which can pass through obscuring gas and dust, also should reveal the locations of black holes, scientists said.

"We're pretty sure that every big galaxy has a super-massive black hole in its center and the models predict that most of the ones that are actively accreting material and get very bright are being hidden by gas and dust around them," Stern said.

NuSTAR will be able to pin down how many black holes are hiding, how big they are and where they are located.

NuSTAR complements NASA's Chandra X-ray observatory and Europe's XMM-Newton telescope, both of which study cosmic X-ray light in lower energy wavelengths.

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The telescope consists of two sets of 133 concentric shells of mirrors, made from flexible glass, such as what is used in laptop computer screens. Since X-rays need a large area to focus, NuSTAR has a 33-foot (10.5-meter) mast that is expected to unfold on June 20.

Both the telescope, which cost about \$180 million, and the Pegasus launcher were built by Orbital Sciences Corp.

(Editing by [Peter Cooney](#) [1])

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