
X-ray researchers turn focus from black holes to cancer

COLUMBUS _ January 28, 2010 _ Two Ohio State University astronomy researchers have established an international reputation for using X-rays and supercomputers to search the vast depths of space to identify elusive black holes.

International team leverages resources of Ohio

Supercomputer Center

COLUMBUS blackhole

– January 28, 2010 – Two Ohio State University astronomy researchers have established an international reputation for using X-rays and supercomputers to search the vast depths of space to identify elusive black holes. Now, they and their interdisciplinary colleagues are repositioning their scientific methodology to peer into the human body to enhance cancer therapy and diagnostics (theranostics).

Led by OSU's Anil Pradhan, Ph.D., and Sultana Nahar, Ph.D., an international research team is using new computer-based models and high-end X-ray spectroscopy to minimize radiation risks and enhance therapeutic efficiency for cancer patients. The X-ray irradiation process causes embedded nanoparticles of iron, gold and other heavy elements to release photons and low-energy electrons to help break up the DNA in malignant tumors. The researchers are also experimenting with bromine, iodine and platinum.

"The resonant nano-plasma theranostics or RNPT could revolutionise X-ray diagnostics and therapy," Pradhan told the science magazine Nature. The RNPT approach would reduce radiation exposure by factors from 10 to 100, he added.

"The Ohio Supercomputer Center, with our flagship IBM Cluster 1350 system, is well positioned to help researchers with this sort of ground-breaking, critically important investigation," said Ashok Krishnamurthy, interim co-executive director of OSC.

Nature recently reported on Pradhan and Nahar's cancer project in its India edition, while just last month, OSC highlighted the duo's recent astronomy work in an annual research publication.

Black holes are invisible, but a plasma sea of super-hot atoms spiraling into black holes betrays their existence. Astronomers study the plasma to collect telltale radiation readings, from the visible to the X-ray, using satellites and large telescopes, such as the Large Binocular Telescope.

Pradhan, Nahar and their team leveraged OSC resources to perform high-accuracy energy calculations to compare with the radiation readings. The most precise large-scale calculations ever made for iron were done by Nahar, who thus is known among astronomers as the "Iron Lady."

X-ray researchers turn focus from black holes to ... https://www.osc.edu/press/x_ray_researchers_tur...
nuclear fusion devices. OSC hosts the team's unique on-line interactive databases (OPSERVER and OSU-NORAD) that are accessed by astronomers and physicists worldwide.

Notes:

For the Nature-India cancer article, see: <http://www.nature.com/nindia/2009/091129/full/nindia.2009.343.html>

For the OSC black hole article, see: <http://www.osc.edu/research/report09/nasa.shtml>

Media Inquiries:

Kathryn Kelley, Director of Outreach, Ohio Supercomputer Center, 614-292-6067, kkelley@osc.edu

Jamie Abel, Director of Media and Communications, Ohio Supercomputer Center, 614-292-6495, jabel@osc.edu

The **Ohio Supercomputer Center** is a catalytic partner of Ohio universities and industries that provides a reliable high performance computing infrastructure for a diverse statewide/regional community. Funded by the Ohio Board of Regents, OSC promotes and stimulates computational research and education in order to act as a key enabler for the state's aspirations in advanced technology, information systems, and advanced industries. For additional information, visit <http://www.osc.edu>

Subjects:

Research