techman / May 13, 2011 02:11PM

[International Engagement][Astrophysics] NTU-LeCosPA Joins International Satellite Telescope Project Monitoring Gamma Ray Bursts

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NTU Highlight (2011/04/28) The Leung Center for Cosmology and Particle Astrophysics (LeCosPA) has joined the Ultra-Fast Flash Observatory (UFFO) project, a new satellite telescope that will observe the instantaneous signals of gamma-ray bursts. The UFFO team was formed by the Korean Ewha Women's University, University of California at Berkeley, Moscow State University and NTU. LeCosPA is not only assembling the telescope's X-ray trigger system, but is also simulating the effects of radiation backgrounds. All project components will be completed by May, in time for final verification testing that commences in June at Taiwan's National Space Organization (NSPO).

For the last two decades, scientific research has seen dramatic breakthroughs in astrophysics and cosmology that have revolutionized our worldview. These discoveries have given rise to further questions for science in the new century, and the search for answers often requires exploring the deepest regions of the universe for signals emanating from the most energetic particles. Gamma-ray bursts are caused by the collapse of massive stars or by the merging of two stars (manifested as neutron stars or black holes). Gamma-ray bursts are the second-most powerful explosions in the universe, emitting most of their energy in the first few seconds from energetic particles. To circumvent confounding effects from Earth's environment and to monitor instantaneous signals from gamma-ray bursts, a satellite telescope, such as that of the UFFO project, is indispensable.

The UFFO telescope is based on microelectronic mechanical systems (MEMS) technology, which can react to transient signals, such as gamma-ray bursts, within one millisecond. The telescope can trace instantaneous gamma-ray burst signals much more effectively than any other existing gamma-ray burst satellite telescope. The UFFO project, therefore, has created a unique scientific opportunity that is at the very forefront of astrophysics.

On the technical side, the Korean collaborators have amassed extensive experience in the development the MEMS-based space telescopes. Taiwan's UFFO team, by contrast, has a solid background in particle and high-energy astrophysics, cosmology, gamma ray detection, radiation simulations and data analysis. NTU will complete the assembly and calibration of the UFFO X-ray trigger system by May. Besides building the trigger system, LeCosPA has also teamed up with NSPO here in Taiwan to conduct space environment verification testing, control for vibration during launch and monitor the thermal-vacuum variation in the space environment.

The UFFO telescope is scheduled to be launched at the Baikonur Cosmodrome in November. The research and development conducted for the UFFO's MEMS micromirror array is expected to prompt technical and commercial applications in Taiwan.

Further Information:
NTU Highlight 2011/04/28

National Science Council International Cooperation Sci-Tech Newsbrief
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Edited 1 time(s). Last edit at 05/13/2011 02:12PM by techman.