News

NASA: Space station becomes dark matter hunter

Astronauts use robotic arms to attach $2B particle detector to orbiter

By Sharon Gaudin
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Computerworld - With a new $2 billion device successfully installed Thursday, the International Space Station has become a dark matter hunter.

Two robotic arms worked in tandem to lift the 15,251- pound instrument, called the Alpha Magnetic Spectrometer-2 (AMS-2), out of space shuttle *Endeavour*'s payload bay and then attached it to the backbone of the space station.

The instrument will orbit the Earth sifting through cosmic particles, providing data that it is hoped will help find the answers to fundamental questions of physics related to antimatter and dark matter.

The main goal of this research is to understand the origin of the universe.

When *Endeavour* lifted off from the Kennedy Space Center on Monday, it was carrying the particle detector along with supplies and spare parts, including an arm for the station's Dextre robot and a robotic arm and hand for the station's humanoid robot.

Endeavour's six-man crew has a busy schedule planned for its 16-day mission. They have to unload and install equipment and experiments, as well as complete four spacewalks. On Thursday, they spent their first day of work focusing on getting the AMS-2 unpacked and set up.

NASA astronauts Andrew Feustel and Roberto Vittori used the space shuttle's robotic arm to extract the particle detector from inside the *Endeavour*. Then the shuttle's robotic arm handed off the instrument to the space station's Canadarm2, a robotic arm onboard the space station. Astronauts Greg Johnson and Greg Chamitoff used the Canadarm 2 to install the AMS-2 on the starboard side of the station's truss, which is the orbiter's backbone.

The particle detector is made up of a ring of powerful magnets and ultrasensitive detectors built to track, though not capture, cosmic rays. It will be operated remotely from Earth.

By studying these cosmic rays with its highly sensitive monitors, the machine should be able to identify a single particle of antimatter or dark matter among a billion other particles.

"The cosmos is the ultimate laboratory," said Nobel laureate and AMS spokesman Samuel Ting, in a previous interview. "From its vantage point in space, AMS will explore such issues as antimatter, dark matter and the origin of cosmic rays. However, its most exciting objective is to probe the unknown, because whenever new levels of sensitivities are reached in exploring an uncharted realm, exciting and unimagined discoveries may be expected."

Scientists have long been curious about antimatter. Scientists at the European Organization for Nuclear Research (CERN) noted that matter, the substance known to make up the world, and antimatter, which, in the most basic terms, is thought to be invisible matter, would have been created in equal amounts when the universe was created. The mystery stems from the fact that we live in a universe that appears to be made only of matter.

Where is the antimatter? Scientists have speculated whether there are places made up of entirely of antimatter -- the opposite of the world that we know.

Scientists at CERN, which helped build the detector, were clearly happy that the instrument safely made it into space and had begun operating Thursday. They tweeted, "#AMS02 is now installed on the ISS, plugged and taking data. Cosmic rays can come now! Congratulation to @NASA and astronauts for great job!"

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