Antimatter and Dark Matter Hunters Publish First Results of Space Experiment AMS

Mark Hoffman

First Posted: Apr 03, 2013 12:13 PM EDT

The antimatter hunter AMS-2, a module on the International Space Station, is searching for the missing pieces of our Universe. The international team running the Alpha Magnetic Spectrometer (AMS) today announced the first results in its search for dark matter, hinting at a new phenomenon and revealing more about the invisible 'dark matter'. Presented by AMS spokesperson Professor Samuel Ting in a seminar at CERN, Geneva, and soon to be published in the journal Physical Review Letters, the recent observations show an excess of positrons -- the antimatter counterparts of electrons -- in the cosmic ray flux.

The Alpha Magnetic Spectrometer is actually not a singular device but consists of seven instruments that monitor cosmic rays from space. Unprotected by Earth's atmosphere the instruments receive a constant barrage of high-energy particles. As these particles pass through AMS-2, the instruments record their speed, energy and direction.

(Photo : NASA)

The Alpha Magnetic Spectrometer AMS-02 is seen installed on the ISS's upper-left side, where it is collecting evidence for dark matter since 2011. The device has to be installed on the ISS because of its considerable power requirements - which are provided by the massive photovoltaic panels of the Space Station, right behind the detector.

The project is one of the largest scientific collaborations of all time involving 56 institutes from 16 countries. The AMS was tested at ESA's technical facility ESTEC in the Netherlands before being shipped to the US for launch on Space Shuttle Endeavour.

The data released today show how the all important ratio between positrons and electrons passing through the AMS changes depending on their energy, confirming data from previous instruments. The AMS results are based on some 25 billion recorded events, including 400,000 positrons with energies between 0.5 GeV (giga electron volt) and 350 GeV, recorded over a year and a half. This represents the largest collection of antimatter particles recorded in space, with the positron fraction demonstrated to increase in the range from 10 GeV to 250 GeV

The findings hint at a new phenomenon but it is unknown whether the positron ratio comes from dark energy particles colliding with each other or from pulsating stars in our galaxy that produce antimatter.

The European Space Agencies Planck satellite showed similar results, revealing just last month that our Universe is made of 26.8% dark matter. AMS-02 and the scientists controlling it are working day and night to investigate the individual particles that make up dark matter. The detector will run for several more years to yield solid data and allow precise calculations.

“Over the coming months, AMS will be able to tell us conclusively whether these positrons are a signal for dark matter, or whether they have some other origin,” hopes Professor Samuel Ting, the project's lead investigator.

http://www.scienceworldreport.com/articles/5994/20130403/antimatter-dark-matter-hunters-publish-first-results-space-experiment-ams.htm