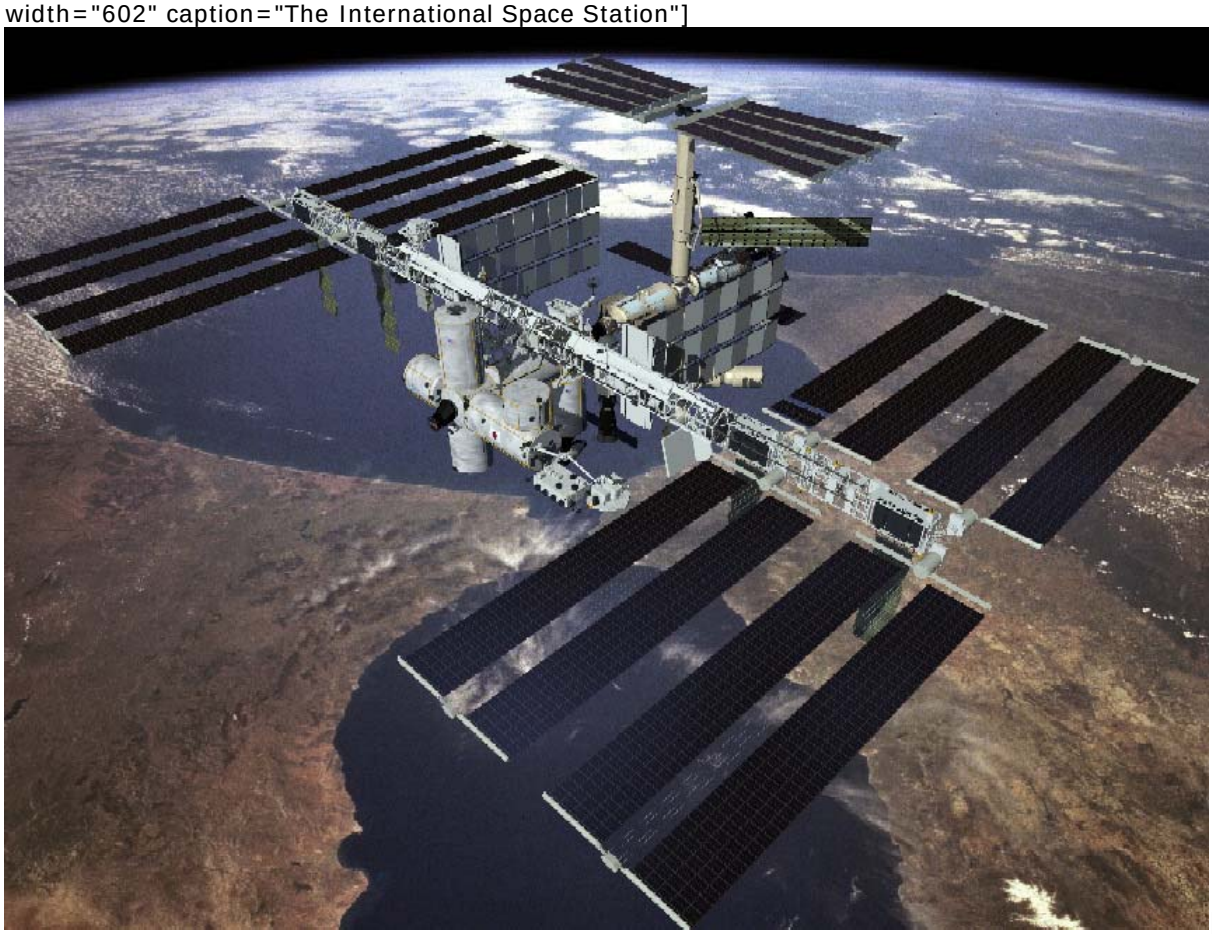
Space Mission: Endeavour Launch on 29th April, To Carry Anti-Matter Detector Into Space

Posted By Debjyoti Bardhan On April 27, 2011 @ 8:30 am In Science | No Comments

On the 29th of April, the space shuttle, Endeavour, will liftoff, primarily, to deliver a multi-billion dollar instrument – the Alpha Magnetic Spectrometer (AMS) – to the International Space Station. The liftoff is scheduled for 1947 GMT from the Kennedy Space Center, Florida.The date was fixed after a number of delays, mostly related to quality control measures and safety precautions. Endeavour is expected to spend almost 16 days in orbit, carrying astronauts, who will be doing four scheduled space-walks and various mission activities so that the space station and its instruments operate without shuttle support.[caption id="" align="alignnone" width="602" caption="The International Space Station"]



[/caption]

The Alpha Magnetic Spectrometer:

The device of central importance in this mission is the Alpha Magnetic Spectrometer (AMS), which weighs about 7 tonnes and costs more than US$2 billion. It is designed to detect signs of anti-matter and dark matter. It will inspect cosmic rays - streams of highly energetic charged particles coming from outer space.The main component of the AMS is the 1900 kg permanent magnet, which can create a magnetic field more than 3000 times stronger than Earth's. Scientists insisted on a permanent magnet, rather than a superconducting one, since the former lasts longer even though it is weaker.Nobel Laureate Samuel Ting [1], principle investigator for the AMS, says:

> When we tested the superconducting magnet in a thermal vacuum chamber to simulate space, we found it could only be operated for three years before it needed to get its liquid helium refilled, and there's really no way to do so without the space shuttle, which has been terminated.

[caption id="" align="alignnone" width="640" caption="The Alpha Magnetic Spectrometer (Courtesy: NASA)"]

[/caption]

Why the AMS?

This mission needs to be carried out in space, because the most cosmic rays, being charged particles, interact with the atmospheric atoms and are absorbed. Cosmic rays provide scientists with energy scales that cannot be produced in the lab. A particle accelerator can only go so much high up on the energy scale, but cosmic rays have particles, which have huge energies since they were emitted from unimaginably energetic cosmic events.Physicists are right now baffled by the questions of baryon asymmetry (why should matter dominate anti-matter, even though the equations don't suggest that?). The AMS hopes to answer, or at least provide clues to, this and many similar questions; scientists are especially hopeful that it will be able to give some hints about dark matter and its role in the expansion in the Universe. Coincidentally, while the AMS hopes to detect anti-helium nuclei, anti-helium has already been detected on Earth, at RHIC, Brookhaven. (Read here [2]) This detection might help calibrate the AMS with higher precision.NASA had shelved the AMS project for quite a while due to the Columbia disaster in 2003. However, many scientists were keen to get AMS off the ground and into space. It is an international collaborative effort involving 600 physicists from 16 countries. Further, as Ting puts it,

> The idea is that if building the International Space Station cost $100 billion, there should really be a good science project there.

Here's wishing NASA and the Endeavour team the very best for this space mission.

URLs in this post:
[1] Samuel Ting: **http://en.wikipedia.org/wiki/Samuel_C._C._Ting**
[2] here: **http://techie-buzz.com/science/heaviest-anti-matter-particle-found-at-rhic.html**