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# Has Dark Matter Finally Been Found? Big News Coming Soon

by Clara Moskowitz, SPACE.com Assistant Managing Editor

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BOSTON — Big news in the search for dark matter may be coming in about two weeks, the leader of a space-based particle physics experiment said today (Feb. 17) here at the annual meeting of the American Association for the Advancement of [Science](#).

That's when the first paper of results from the [Alpha Magnetic Spectrometer](#), a particle collector mounted on the outside of the International Space Station, will be submitted to a scientific journal, said MIT physicist Samuel Ting, AMS principal investigator.

Though Ting was coy about just what, exactly, the experiment has found, he said the results bear on the mystery of dark matter, the invisible stuff thought to outnumber regular matter in the universe by a factor of about six to one.




The powerful Alpha Magnetic Spectrometer-2 (AMS) is visible at center left. The blackness of space and Earth's horizon provide the backdrop for the scene, on May 20, 2011 (Flight Day 5 of the STS-134 shuttle mission).

CREDIT: NASA

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"It will not be a minor paper," Ting said, hinting that the findings were important enough that the scientists rewrote the paper 30 times before they were satisfied with it. Still, he said, it represents a "small step" in figuring out what dark matter is, and perhaps not the final answer. [\[Photos: AMS Hunts Exotic Particles In Space\]](#)

Some physics theories suggest that [dark matter is made of WIMPS](#) (weakly interacting massive particles), a class of particles that are their own antimatter partner particles. When matter and antimatter partners meet, they annihilate each other, so if two WIMPs collided, they would be destroyed, releasing a pair of daughter particles — an electron and its antimatter counterpart, the positron, in the process.

The [Alpha Magnetic Spectrometer has the potential](#) to detect the positrons and electrons produced by dark matter annihilations in the Milky Way. The \$2 billion machine was installed on the International Space Station in May 2011, and so far, it has detected 25 billion particle events, including about 8 billion electrons and positrons. This first science paper will report how many of each were found, and what their energies are, Ting said.

If the experiment detected an abundance of positrons peaking at a certain [energy](#), that could indicate a [detection of dark matter](#), because while electrons are abundant in the universe around us, there are fewer known processes that could give rise to positrons.

"The smoking gun signature is a rise and then a dramatic fall" in the number of positrons with respect to energy, because the positrons produced by dark matter annihilation would have a very specific energy, depending on the mass of the WIMPs making up dark matter, said Michael Turner, a cosmologist at the University of Chicago who is not involved in the AMS project. "That's the key signature that would arise."

Another telling sign will be the question of whether positrons appear to be coming from one direction in space, or from all around. If they're from dark matter, scientists expect them to be spread evenly through space, but if they're created by some normal astrophysical process, such as a star explosion, then they would originate in a single direction.

"There is a lot of stuff that can mimic [dark matter](#)," said theoretical physicist Lisa Randall of Harvard University, who is also

not involved in the project but said she's eagerly awaiting the AMS results. "In these experiments the question is when do you have antimatter that could be explained by astrophysical sources, and when do you have something that really could be an indication that you have something new?"

Regardless of whether AMS has found dark matter yet, the scientists said they expected the question of dark matter's origin to become clearer soon. In addition to AMS, other experiments such as the Large Hadron Collider in Switzerland, and underground dark matter detectors buried around the world, could also make a discovery in the near future.

"We believe we're on the threshold of discovery," Turner said. "We believe this will be the decade of the WIMP."

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Clara has been SPACE.com's Assistant Managing Editor since 2011, and has been writing for SPACE.com and LiveScience since 2008. Clara has a bachelor's degree in astronomy and physics from Wesleyan University, and a graduate certificate in science writing from the University of California, Santa Cruz. To find out what her latest project is, you can follow Clara on [Google+](#).

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**Brad Arnold** · Top Commenter · Night Auditor at Country Inn and Suites, Plymouth Minnesota  
 Or Dark Matter could be interdimensional...something from "nothing" is a known physical principle (believe it or not).  
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**me** (signed in using yahoo)  
 It's been 3 weeks now. And still waiting on that "big news". lol  
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**Dylan Spano** · Top Commenter · Cumberland, Maryland  
 It's been two weeks; I'm waiting!  
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**David Dennis** · Bla bla  
 You'd expect interactions between dark matter and anti dark matter to be pretty rare. They are uncharged.  
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**sdpa169** (signed in using AOL)  
 Here we go BIG EVENT! Maybe they will just release another Controller for PS4.  
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**Ewan Fallon** · Top Commenter · Paisley College  
 I think dark matter will prove to be an energy matter without any matter and as a matter of fact, will prove to be the resultant of disturbed pure energy seeking equilibrium.  
[Reply](#) · [2 Like](#) · February 26 at 1:42pm



**Creatorrose Ashraf**  
 You got the theory behind WIMPS right with the exception that it clearly does not prove any dark matter's existence that is why it is called the Wimps! Lol!  
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**Indy Khurana** · Kuala Lumpur, Malaysia  
 Looks like this is a more advanced detection of dark matter rather than capturing it - like what scientists did with neutrinos. We are still far away from capturing it - that's when we will unlock the true secrets of dark matter, but it takes small steps like these to reach there - Kudus!  
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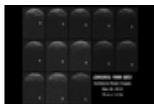
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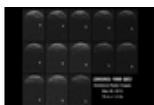
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