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## 'Anti alpha' mirror-matter made from gold in atomsmasher Shuttle *Endeavour* mission 'may find antimatter worlds'

By [Lewis Page](#)

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Allied international boffins are exceedingly chuffed this week to announce a recordbreaking reverse-alchemy triumph: gold has been turned into extra hefty nega-helium antimatter by using an enormously powerful atom smasher.

The particle-punisher in question was not our old friend the Large Hadron Collider but rather the earlier Relativistic Heavy Ion Collider (RHIC) at the USA's Brookhaven national lab. Science-alliance brainboxes there make it their daily business to slam bits of gold together with unimaginable violence, so mangling the very stuff of the universe in fashions not seen since the ultimate dawn of time itself.

Such fearful wrenchings and rendings can produce strange results indeed: retro-alchemists at the RHIC's mighty STAR hyper-instrument experimento-complex [last year](#) [1] managed to produce a "negatively strange" anti-hyper-deuterium nucleus, for instance.

(To explain: Normal humdrum matter and antimatter have zero strangeness. Rarely, strange, or even positively-strange stuff may be seen. Most outrageously of all, it is possible to have matter or antimatter whose strangeness is not zero, not positive, but *negative*. This strangely-strange stuff, by definition unstrange - ultramundane – infraboring – twists and mangles not only the fabric of spacetime but that of the English language too.)

Fresh from their negative strangeness triumphs, the boffins of the STAR (Solenoidal Tracker At RHIC, perhaps more properly known as STAR-HIC or similar) have now breached new barriers. Sifting the exotic sub-ultra-minuscule shrapnel showering from their goldbanging matter pulverisation experiments, they have now discovered the biggest lumps of antimatter ever detected by humanity: antihelium-4 nuclei, the antimatter mirror image of the common or garden alpha particle.

The creation of these so-called "anti-alphas" is thought to have happened from interactions amid the quark-gluon plasma "soup" produced in the RHIC when gold nuclei crash into one another going at just a gnat's chuff less than the speed of light. According to the top boffins of the STAR, the number of collisions and the immense lakes of gluon gumbo involved bear out calculations indicating that there's basically no way for antihelium-4 to come into existence naturally from regular matter of the type which is believed to make up pretty much everything.

This is important, because the fact of just about everything as far as we know being made of normal matter is very troublesome for science in that it doesn't make any sense. Equal amounts of matter and antimatter ought to have been created at the Big Bang.

For their next trick, the antimatter physics community plan to investigate this business further: and

being particle physicists they aren't going to fool about with any test tubes or fossils or any such puny accoutrements as favoured by other, lesser sciences.

No: in this case we have the Alpha Magnetic Spectrometer (AMS), the arse-kickingest scientific instrument ever to be placed into space, where it needs to be in order to sniff the possible antimatter winds of the cosmos. Even now the mighty probe is loaded aboard Space Shuttle *Endeavour* where she stands on the pad at Cape Canaveral, ready to lift off on Friday if all goes according to plan.

Merely being in space is not enough, however: the AMS requires more power than any feasible satellite or spacecraft built here on Earth could possibly yield. Thus the great instrument is destined for installation aboard the International Space Station, assembled in orbit, possessor of the largest solar arrays ever placed in space. Only the station could power the AMS as it searches the cosmic deeps for the answer to the antimatter conundrum.

That answer could be a surprising one.

"Collisions among cosmic rays near Earth can produce antimatter particles, but the odds of these collisions producing an intact antihelium nucleus are so vanishingly small that finding even one would strongly suggest that it had drifted to Earth from a distant region of the universe dominated by antimatter," explains Hans Georg Ritter, a top boffin at the Lawrence Berkeley lab in California.

"Antimatter doesn't look any different from ordinary matter, but AMS finding just one antihelium nucleus would suggest that some of the galaxies we see are antimatter galaxies," he adds, raising the possibility of suns, worlds, even alien races made of antimatter.

Read all about it in the STAR boffins' blockbusting *Nature* paper [here](#) [2] (subscription required). ®

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1. [http://www.theregister.co.uk/2010/03/05/negative\\_strangeness/](http://www.theregister.co.uk/2010/03/05/negative_strangeness/)
2. <http://www.nature.com/nature/journal/vaop/ncurrent/abs/nature10079.html>

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