



Mysterious Antimatter Physics Discovered at the Large Hadron Collider

(scientificamerican.com)



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Posted by EditorDavid on Monday July 21, 2025 @12:34AM from the what's-the-matter dept.

"Scientists at the world's largest particle collider have observed a new class of antimatter particles breaking down at a different rate than their matter counterparts," [reports Scientific American](#):

[P]hysicists have been on the hunt for any sign of difference between matter and antimatter, known in the field as a violation of "charge conjugation-parity symmetry," or CP violation, that could explain why some matter escaped destruction in the early universe. [Wednesday] physicists at the Large Hadron Collider (LHC)'s [LHCb experiment](#) published a paper in the journal *Nature* announcing that they've [measured CP violation for the first time in baryons](#) — the class of particles that includes the protons and neutrons inside atoms.

Baryons are all built from triplets of even smaller particles called quarks. Previous experiments dating back to 1964 had seen CP violation in meson particles, which unlike baryons are made of a quark-antiquark pair. In the new experiment, scientists observed that baryons made of an up quark, a down quark and one of their more exotic cousins called a beauty quark decay more often than baryons made of the antimatter versions of those same three quarks... The matter-antimatter difference scientists observed in this case is relatively small, and it fits within predictions of the Standard Model of particle physics — the reigning theory of the subatomic realm. This puny amount of CP violation, however, cannot account for the profound asymmetry between matter and antimatter we see throughout space...

"We are trying to find little discrepancies between what we observe and what is predicted by the Standard Model," [says LHCb spokesperson/study co-author Vincenzo Vagnoni of the Italian National Institute of Nuclear Physics]. "If we find a discrepancy, then we can pinpoint what is wrong." The researchers hope to discover more cracks in the Standard Model as the experiment keeps running. Eventually LHCb should collect about 30 times more data than was used for this analysis, which will allow physicists to search for CP violation in particle decays that are even rarer than the one observed.

So stay tuned for

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Is it that time of the year? (Score:1) It seems that lots of science research and discoveries are made in July to September.Is there any
1 hidden comment

University fiscal year starts September 1st Is this a year-end clean-out to get all the discoveries on the books before year end?

Re: You understand that Switzerland is not in America, right?Also, The Italian Institute of National Physics are not too concerned about

Re:Is it that time of the year? (Score:5, Informative)

by pz (113803) on Monday July 21, 2025 @01:33AM (#65533986) Journal

The peer-review process is so unpredictable and irregular that it effectively decouples the time-of-year for the discovery from the time-of-year for the publication of said discovery.

So, the answer to your question is, "no," on that grounds.

But, also, if there **were** any push for results, it would be aligned with the end-of-budgetary-year for a given grant, which is three times per year, and doesn't necessarily align with the Federal fiscal cycle.

So, again, the answer is, "no."

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Re: What you say is true, but there's also a sense in which the announcement of results does have a bias to the northern hemisphere

So (Score:2) There was a CP violation at the Hadron Collider, noted.

This is just so cool (Score:1) I don't have anything useful to add here,

Re: This is just so cool Yeah, till they create a black hole and we are all spaghettiified.

Maybe... (Score:2) ... more matter was formed than antimatter at the big bang for reasons that only existed at the moment (or maybe before)

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Nothing will ever be attempted if all possible objections must be first overcome. -- Dr. Johnson

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