Scientists stunned, sceptical on faster-than-light particles

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Physicists around the world expressed astonishment and scepticism in equal measure Friday after European scientists reported particles apparently travelling faster than light.

Tiny specks called neutrinos were clocked at 300,006 kilometres per second -- slightly faster than the speed of light -- along a 730-kilometre (453-mile) trajectory between the European Centre for Nuclear Research (CERN) in Switzerland and a laboratory in Italy.

If verified, the results would dismantle a key plank of Einstein's theory of relativity and deeply unsettle our understanding of the physical world.

"That is a very, very big 'if'," said Alfons Weber, a professor of particle physics at Oxford University, and an expert on neutrinos.

"Since this is the only indication we have that there is something wrong (with Einstein's theory), we need to see if there is some measurement artifact" which could have biased the results, he said by phone.

"People are going to challenge this discovery -- if discovery there is," said Jonathan Ellis, a theoretical physicist at CERN not directly involved in the experiment dubbed OPERA.

Even researchers who conducted the tests seemed leery of their own findings.

"An apparently unbelievable result," is how Sergio Bertolucci, Research Director CERN, described it. "We need to be sure that there are no other mundane explanations. That will require independent measurements."

Scientists at CERN and the Gran Sasso Laboratory in Italy scrutinised their results for nearly six months before making the announcement.

"If a fact is scientifically established, I'll believe it," Pierre Fayet, a theoretical physicist at France's Ecole Normale Superieure, told French newspaper Liberation.

"But that's what has to be verified in exacting detail because this observation beggars belief."

A call for independent verification was a common refrain among physicists reacting to the news. That will happen is two steps, they said.

The first will be to evaluate the results and all the supporting data, which was published overnight on a physics website (arXiv.org).

Pierre Binetruy, director of the Astroparticle and Cosmology Laboratory in Paris, did not participate in the experiments but said he had been poring over the data for a week "looking for the little glitch or error, because these findings are altogether revolutionary."

Most independent physicists, however, were in the dark until rumours began to circulate earlier this week, and thus will need more time, said Weber, who took part in a similar experiment at the US Fermilab in 2007.

The next step will be to duplicate the neutrino experiment in another laboratory, which could happen within months.

But there are only two facilities currently operational capable of carrying out such tests, said Weber.

One is at the national Fermilab outside Chicago, where the 2007 effort -- part of a project called MINOS -- hinted at faster-than-light speeds but fell within the margin of error.

"We are already thinking about upgrades that would allow us to make competitive measurements," said Weber.

The other site is in Japan, where an international team of physicists last year detected neutrinos that had travelled the width of Honshu island to the giant Super-Kamiokande underground detector.

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