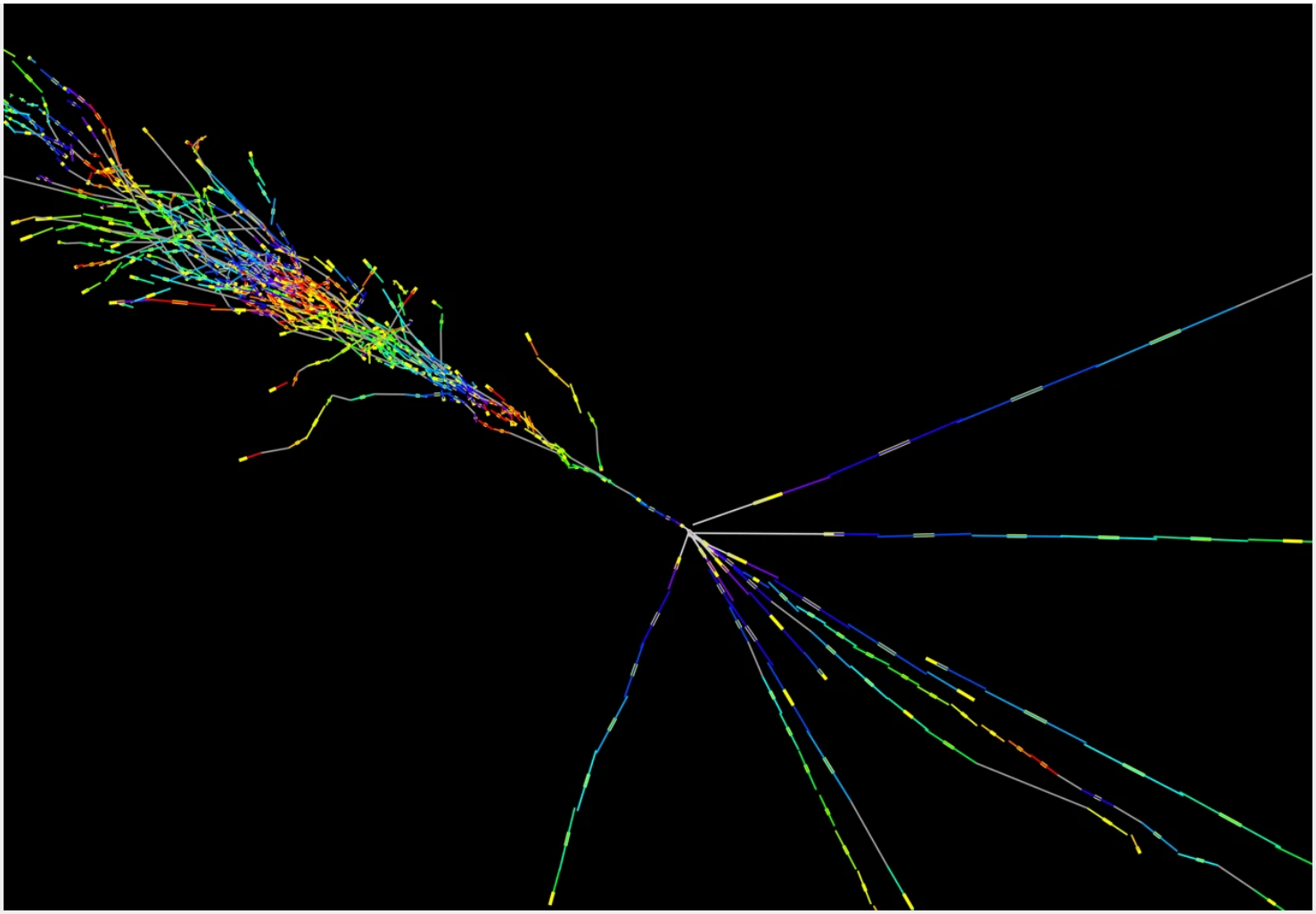
nature

RESEARCH HIGHLIGHT | 26 July 2024

Elusive high-energy neutrinos spotted at LHC

Observations of electron neutrinos could allow physicists to test theories about the particles' behaviour.



Credit: R. M. Abraham *et al./Phys. Rev. Lett.* (FASER Collaboration) (CC BY 4.0)

The Large Hadron Collider (LHC), the particle accelerator outside Geneva, Switzerland, was never meant to study neutrinos: the particles are ubiquitous but notoriously hard to catch[1].

But a recent addition to the LHC, the Forward Search Experiment (FASER), is now detecting highly energetic neutrinos that escape after emerging as a byproduct of proton collisions.

FASER is located in a service tunnel 480 metres from the point at which proton beams collide head-on inside the LHC's ATLAS experiment. In its first breakthrough, last year, the FASER collaboration reported the detection of one of the three types of neutrino, called muon neutrinos.

Now, the collaboration has spotted four neutrinos of a second type, called electron neutrinos. FASER is expected to discover the third and final type, tau neutrinos, in the future.

FASER's neutrinos are the most energetic artificially made neutrinos ever detected, and will help physicists to check whether the particles behave as predicted by theory.

doi: https://doi.org/10.1038/d41586-024-02465-8

References

1. Abraham, R. M. *et al. Phys. Rev. Lett.* **133**, 021802 (2024).

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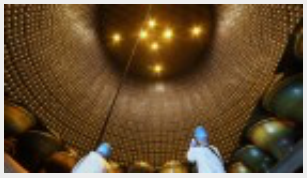

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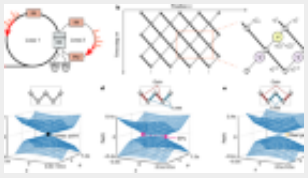

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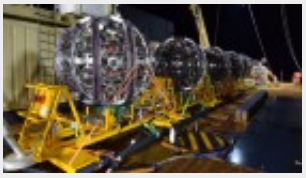

'Fantastic' particle could be most energetic neutrino ever detected

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