

Glimmer of Light Appears in Search for Dark Matter

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The Leiden astrophysicist Alexey Boyarsky and his fellow researchers may have identified a trace of dark matter that could signify a new particle: the sterile neutrino. A research group in Harvard reported a very similar signal just a few days earlier.

Sterile neutrino has mass

The two groups reported that they have found an indirect signal from dark matter in the spectra of galaxies and clusters of galaxies. They made this discovery independent of one another, but came to the same conclusion: a tiny spike is hidden in the xX-ray spectra of the Perseus galaxy cluster, at a frequency that cannot be explained by any known atomic transition. The Harvard group sees the same spike in many other galaxy clusters, while Boyarsky also finds it in the nearby Andromeda galaxy. The researchers put it down to the decay of a new kind of neutrino, called 'sterile' because it has no interaction with other known neutrinos. A sterile neutrino does have mass, and so could be responsible for the missing dark matter

Minor expansion of the standard model for elementary particles

The first indications for the existence of dark matter in space were found more than 80 years ago, but there are still many questions surrounding this invisible matter. Sterile neutrinos are a highly attractive candidate for the dark matter particle, because they only call for a minor extension of the already known and extensively tested standard model for elementary particles. Boyarsky and his colleagues have already had this extension of the standard model ready for some time, but were waiting for the first observation of the mysterious particle. Measurements at higher

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resolution will shed light on the matter, and there is reason to hope that the spectral line just discovered will finally eliminate the problem of the missing mass.

Boyarsky is assistant professor at the Leiden Institute for Research in Physics (LION) where he conducts research on dark matter and the early Universe. The discovery of the incidence of the sterile neutrino was made by Boyarsky's research group together with Oleg Ruchayskiy, a researcher at the Ecole Polytechnique Fédérale de Lausanne in Switzerland.

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