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The R2D2 neutrinoless double-beta decay experiment

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The search for neutrinoless double-beta ($0\nu\beta\beta$) decay aspires to cast light on a critical piece missing in our knowledge: the nature of the neutrino mass. This is the most sensitive experimental way to demonstrate that neutrino is a Majorana particle.

The challenge of observing such a potentially rare process demands a detector with excellent energy resolution, extremely low radioactivity and a large mass of emitter isotope. The R2D2 project is an R&D effort to investigate the feasibility of a high-pressure spherical TPC as a detector for $0\nu\beta\beta$ decay searches. A prototype has demonstrated excellent resolution with Argon, and preliminary results with Xenon are very promising. Furthermore, the simultaneous read-out of ionisation and scintillation light has been demonstrated, which will facilitate event localisation.

These proof-of-concept results obtained with the first R2D2 prototype will be presented, and the next steps in the R&D roadmap will be discussed.

In-person participation

Yes

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