



**RESEARCH**

**BELLE II NARROWS THE Z' PARTICLE RESEARCH FIELD**

A portal, a transition point between ordinary matter and dark matter: this could be what Z', a hypothetical boson-type particle, represents. The Belle II international collaboration, in which INFN also participates, is looking for the Z' particle in collisions between electrons and positrons in the SuperKEKB accelerator, in the KEK laboratory, in

Tsukuba, Japan. The scientists of Belle II have finished analysing the data collected in the 2018 collisions, and on 6 April published their research in Physical Review Letters (PRL), which the magazine selected as an Editor's Suggestion. The results place new limits on the existence of Z', narrowing the field in which this particle could be observed. The Z' boson is one of the most promising candidates for connecting dark matter to the Standard Model, and could be produced in collisions between electrons and positrons, before decaying into invisible constituents of dark matter. Theoretic models and detailed simulations predict that the Belle II experiment would be capable of detecting a clear Z' production signal, by searching for an excess of events in which two muons of opposite charge are produced. The data available up until today, and presented in the article published in PRL, does not, thus, show evidence of this signal. The final research, which will be conducted by the Belle II collaboration over the next years on vast samples of data, will, therefore, be determining in either confirming the existence of a Z' boson that interacts weakly with ordinary matter particles, or excluding it. ■