



## RESEARCH

### GERDA MARKS A NEW RECORD IN MAJORANA'S NEUTRINO RESEARCH

The GERDA experiment, at INFN Gran Sasso National Laboratories (LNGS), has achieved another important scientific milestone, reaching a new record in sensitivity in research into the extremely rare neutrinoless double beta decay. If detected, this decay would provide essential information on the nature of neutrinos and on why there is much more matter than antimatter in the current universe. In particular, it would demonstrate that the neutrino is a Majorana particle; it coincides with its antiparticle. Being excluded by the Standard Model, the process would provide important clues on the existence of New Physics, beyond the Standard Model. If observed, the neutrinoless double beta decay would be the rarest of decays, with a half-life many times greater than the age of the universe. It is understandable, then, how crucial it is to reduce the “background processes”: much more common natural events that simulate the signal being looked for, thus contaminating it and making it difficult to detect.

The decay has so far escaped observation, but GERDA is the first experiment to reach a sensitivity, in measuring the half-life of the nuclei (that is, the time that must pass before half of the nuclei give way to decay) of more than  $10^{26}$  years, which is greater than the age of the universe.

The result - published on 5 September in the scientific journal *Science* - was obtained after having collected uninterrupted data for two and a half years and having reduced the events that constitute the background noise to a very low level. ■