

## Investigation of double beta decay of $^{58}\text{Ni}$ at the Modane Underground Laboratory

*Tuesday 25 July 2017 13:30 (15 minutes)*

Investigation of double beta decay ( $\beta^+\text{EC}$ ,  $\text{EC}/\text{EC}$ ) of  $^{58}\text{Ni}$  was performed at the Modane underground laboratory (LSM, France, 4800 m w.e.) using the ultra-low background spectrometer Obelix and a sample of natural Ni. Spectrometer Obelix is based on P-type coaxial HPGe detector with a sensitive volume of 600 cm<sup>3</sup> and relative efficiency of 160 %. The detector part of the cryostat is encircled by several layers of roman and low-active lead and flushed with radon-depleted air. The sample of natural nickel, containing ~68% of  $^{58}\text{Ni}$  with a total mass of ~21.7 kg was prepared in a shape of Marinelli beaker and placed on the Obelix detector. Three experimental runs were performed with the investigated sample in 2014 - 2017 years. New experimental limits (at 90% CL) on half-lives of  $\beta^+\text{EC}$  and  $\text{EC}/\text{EC}$  decays of  $^{58}\text{Ni}$  to excited states of  $^{58}\text{Fe}$  were obtained in these investigations, improving the previous experimental limits by approximately two orders of magnitude.

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**Session Classification:** Neutrino Parallel

**Track Classification:** Neutrinos