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BINGO: Bi-Isotope 0ν2β Next Generation Observatory

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Neutrinoless double-beta decay (0ν2β) is a hypothetical rare nuclear transition. Its observation would provide an important insight about the nature of neutrinos (Dirac or Majorana particle) demonstrating that the lepton number is not conserved. BINGO aims to set the technological and conceptual grounds for future bolometric 0ν2β experiments. It is based on a dual heat-light readout, i.e. a main absorber embedding the double-beta decay isotope faced by a light detector. Dual heat-light readout helps to reject the α background component, thanks to the lower light output of α's compared to β/γ's. BINGO will study two of the most promising isotopes: 100Mo embedded in Li2MoO4 and 130Te embedded in TeO2. BINGO's proposed technology aims at reducing dramatically the background in the region of interest, thus boosting the discovery sensitivity of 0νββ. This can be achieved by fulfilling the following goals: (i) increasing the light detector sensitivity thanks to Neganov-Luke amplification; (ii) having a revolutionary detector assembly that will reduce the total surface radioactivity contribution; (iii) using an active shield, based on ZnWO4 or BGO scintillators with bolometric readout, to suppress the external gamma background. The proposed solutions will have a high impact on next-generation bolometric tonne-scale experiments.
In this contribution we present the first results on the revolutionary assembly and on the bolometric veto.

Reference to paper (DOI or arXiv)

Your gender (free text)

Primary author(s) : NONES, Claudia (IRFU/DPhP)

Presenter(s) : NONES, Claudia (IRFU/DPhP)

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