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Ba-tagging with fluorescence bicolor molecules for background-free $0\nu\beta\beta decay experiment.

Thursday, March 18, 2021 2:00 PM (20 minutes)

The next generation of neutrinoless double beta decay searches aims to reach sensitivities in the half-life of the process up to 10^{28} years. This will require tonne scale detectors with essentially no background in their region of interest. One of the most promising solutions, which may be implemented by gas or liquid xenon TPCs, is the possibility of tagging the daughter ion produced in the decay. The NEXT collaboration is currently involved in an intense R&D program based on fluorescent molecular indicators able to capture the Ba^{++} cation, changing their spectral response when chelated. In this talk, I will present one of the NEXT R&D lines, called BOLD, which proposes the use of fluorescent bicolor indicators (FBI). I will show the latest results based on the spectral shift of the emission fluorescence of this molecule after Ba^{++} capture in dry media. The emission light must be scrutinized to differentiate the signal of one chelated molecule among a background of non-chelated ones. I will show our current approach to the problem for Single-Molecule Fluorescence Imaging (SMFI) and the strategy to achieve the goal, i.e. integration of detection technique into a pressurized xenon gas detector.

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