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Barium Tagging for NEXT Search for Neutrinoless Double Beta Decay KAREN NAVARRO, University of Texas at Arlington, NEXT COLLABORATION — The reduction of background events is a necessity in the search for neutrinoless double beta decay ($0\nu\beta\beta$). One technique that could reduce backgrounds at the energy of the neutrino-less decay is the identification of the barium daughter of the double beta decay of 136Xe, known as "barium tagging". Recent results have demonstrated single Ba2+ ion resolution in dry state single molecule fluorescence imaging (SMFI) using custom designed fluorescent molecules. I will discuss the most recent developments in dry stage SMFI as well as presenting the R&D program to be undertaken in the next few years. Particular focus will be given to the GodXilla program at UTA that uses controllable beams of Ba2+ ions to test SMFI sensors in the gas phase. Future R&D within the NEXT collaboration will concern the transportation of Ba2+ ions to fluorescent sensors within large volumes of high-pressure xenon gas. Ultimately this research will result in a design for a background free 136Xe double beta decay experiment combining a high-pressure gas TPC with SMFI microscopy.

Karen Navarro
University of Texas at Arlington

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