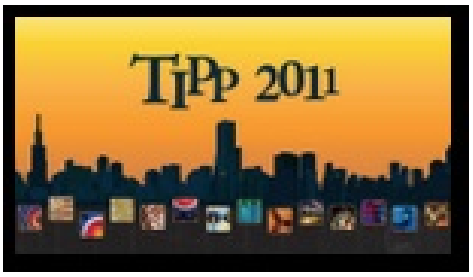

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Single ion detection for an ultra-sensitive neutrino-less double beta decay search with the Enriched Xenon Observatory

Saturday 11 June 2011 16:40 (20 minutes)

The next generation neutrino-less double beta decay experiments aim to probe Majorana neutrino masses at or below 10 meV. To reach this sensitivity ton-scale detectors are needed with even lower residual radioactive backgrounds than the best ones operating today or planned for the near future. The Enriched Xenon Observatory (EXO) collaboration is developing a novel strategy for a virtually background-free search for neutrino-less double beta decay of xenon-136. EXO plans to detect individual barium-136 ions resulting from such decays combining optical spectroscopy and ion physics techniques with rare event detector technologies. If proven possible with high efficiency, single ion identification would allow one to eliminate all non-barium producing backgrounds which are the limiting factor for current and planned experiments. The EXO collaboration is actively pursuing barium-tagging strategies for both liquid and gaseous xenon detectors. The progress of such research will be presented and the prospects towards a ton-scale EXO experiment discussed.

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