

# The Enriched Xenon Observatory for Double Beta Decay

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The Enriched Xenon Observatory (EXO) is a project aiming at detecting neutrinoless double beta decays of  $^{136}\text{Xe}$ . A xenon-filled time projection chamber (TPC) supplemented with scintillation light readout detects ionising particle interactions within its volume. When candidate events are recorded, the  $^{136}\text{Ba}$  ion daughters will be identified, event by event, by means of optical spectroscopy. This coincidence technique would allow for a measurement of double beta decays virtually immune to external radioactive contaminations. The EXO collaboration is planning on combining these experimental techniques in a ton-scale Xe detector using a phased approach. A smaller detector, EXO-200, employing 200 kg of enriched xenon (80%  $^{136}\text{Xe}$ ) in liquid form within a TPC with scintillation readout and with no Ba identification, is in advanced stage of assembly. Its cryogenic and xenon handling systems are being re-assembled at the Waste Isolation Pilot Plant (WIPP) underground site in New Mexico. The central detector is planned to be installed by early 2008. As a parallel effort to EXO-200, strategies for Ba tagging are being developed in the laboratory. I will present the EXO experiment in the context of neutrinoless double beta decay searches and describe the EXO-200 detector in detail, discussing its physics goals, experimental challenges, and schedule. I will also illustrate some of the most promising approaches for tagging single Ba ions produced in a ton-scale Xe detector, show milestone results achieved in laboratory setups, and discuss the EXO timeline for the near future.