

# Holy Cross College Physics Colloquium

Haberlin 219, 4 PM  
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## "Understanding the Neutrino: The Search for Neutrinoless Double Beta Decay"

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### **Abstract**

Neutrinos are electrically neutral, fundamental particles of the Standard Model of particle physics. While their existence was postulated nearly 100 years ago and proven over 50 years ago, their fundamental nature remains elusive. Observations of neutrinos are currently at odds with the Standard Model which ascribes zero mass to neutrinos. We know that neutrinos do have mass, thanks to the neutrino oscillation phenomenon, which is much tinier than that of the electron. One of the most theoretically compelling extensions to the Standard Model is that neutrinos are massive Majorana fermions, which would mean neutrinos are their own antiparticles.

This talk will describe an experimental program that could prove that neutrinos are Majorana fermions via the search for neutrinoless double beta decay of Xenon-136 with the nEXO experiment. I will discuss the principles of the nEXO detector and our current work in the nEXO collaboration towards the final designs of the experiment to achieve the desired sensitivity.