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## **The Unbearable Lightness of Neutrinos**

### **Abstract:**

Ever since it was first hypothesized 89 years ago, the strange and ghostly particle called the neutrino has mystified and inspired particle and nuclear physicists. After decades of experimental and theoretical work, we have now firmly established that neutrinos have mass, and yet their absolute mass scale remains unknown. Now, after many years of painstaking design, construction, and commissioning work, the Karlsruhe Tritium Neutrino experiment (KATRIN) has recently improved the world's best direct neutrino-mass sensitivity by a factor of two, with more improvements to come. I will give a tour of KATRIN's 70-m beamline, share some of our adventures with engineering challenges and novel backgrounds, describe our spectral fits and systematic uncertainties, and show a glimpse of KATRIN's future.

### **Bio:**

Diana Parno earned her PhD in 2011 from Carnegie Mellon University, with a dissertation on the spin structure of the neutron as explored at Jefferson Lab. She soon shifted her attention to a different neutral particle — the neutrino — with a postdoc position at the University of Washington, where she eventually joined the research faculty and became Associate Director of the Center for Experimental Nuclear Physics and Astrophysics (CENPA). In 2017 she returned to CMU and is now an Assistant Professor of Physics there. She is an Analysis Co-coordinator for the KATRIN experiment as well as working on the COHERENT and TRIMS experiments. She chaired the writing team for the Best Practices Guide for LGBT+ Inclusion in Physics and Astronomy Departments in 2018.