Kerstin Perez –MIT - Colloquium 4/6/2019

Title: In Search of Cosmic-Ray Antinuclei from Dark Matter

Abstract:
Cosmic-ray antiprotons have been a valuable tool for dark matter searches since the 1970s. Recent years have seen increased theoretical and experimental effort towards the first-ever detection of cosmic-ray antideuterons, in particular as an indirect signature of dark matter annihilation or decay in the Galactic halo. In contrast to other indirect detection signatures, which have been hampered by the large and uncertain background rates from conventional astrophysical processes, low-energy antideuterons provide an essentially background-free signature of dark matter, and low-energy antiprotons are a vital partner for this analysis. I will discuss the upcoming balloon-borne GAPS experiment, which exploits a novel detection technique utilizing exotic atom capture and decay to provide sensitivity to antiproton, antideuteron, and antihelium cosmic-ray signatures. In particular, I will detail the fabrication of the lithium-drifted Silicon detectors that are essential to its success.