THE OHIO STATE UNIVERSITY

Department of Physics

SPECIAL COLLOQUIUM

Monday, May 14, 2012

1:30 P. M. Robert Smith Seminar Room

1080 Physics Research Building

Annika Peter

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"Unveiling the Dark Side of Dark Matter"

The nature of dark matter is one of the major "known unknowns" of physics of the universe. From astronomical observations, we know that dark matter exists, makes up 23% of the mass budget of the universe, clusters strongly to form the load-bearing frame of structure for galaxy formation, and hardly interacts with ordinary matter Although most of what we know about dark matter comes from astronomy, most of the effort now to characterize dark matter is focused on non-gravitational interactions between dark matter and standard-model particles. However, dark matter may live in a new, dark sector of physics with only tenuous connections to the standard model. The challenge is to learn about the physics of this new sector without relying on measurable non-gravitational interactions with the standard model. In this talk, I argue that astronomical searches can elucidate some of the dark physics of dark matter. I will show how the physics within a new dark sector may imprint itself on the formation and growth of cosmological structure in the universe, which may then be probed using the gravitational interactions between dark matter and standard-model particles. I will outline which currently existing data sets can provide interesting constraints already, and what kinds of theoretical and observational work should be done in the future for even better constraints on the physics of dark matter.

RECEPTION AT 1:15 P.M. IN ATRIUM, PRB