APS DIVISION OF PARTICLES & FIELDS
DPF 2017
MEETING OF THE AMERICAN PHYSICAL SOCIETY DIVISION OF PARTICLES AND FIELDS

Contribution ID: **116** Type: **Presentation**

An Indirect Search for Weakly Interacting Massive Particles in the Sun Using Upward-Going Muons in NOvA

Tuesday, 1 August 2017 14:45 (15 minutes)

We present the status of the a dark matter search using a dataset collected with an upward-going muon trigger at NOvA.
Weakly Interactive Massive Particles are a theoretical potential non-baryonic form of Dark Matter.
The nature of Dark Matter is one of the most interesting open
questions in modern physics. Evidence for DM existence comes from cosmological observations but the discovery has not been made yet. If we
assume that DM particles can produce Standard Model particles through
their interactions, indirect searches can help shed light on this
mystery.

The NOvA collaboration has constructed a 14,000 ton, fine-grained, low-Z, total absorption tracking calorimeter. This detector, with its
excellent granularity and energy resolution and relatively low-energy neutrino thresholds, is
designed to observe electron neutrino appearance in a muon neutrino beam: but it also has unique capabilities suitable for more exotic measurements. In fact, with an efficient upward-going muon trigger and sufficient background suppression offline, NOvA will be capable of a competitive indirect
dark matter search for low-mass WIMPs.

To avoid the downward-going cosmic-ray muon background, we use only
upward-going muons that point to the Sun. So, the search occurs at night when the Sun is on the other side of the Earth. This also allows us to use the time when the Sun is above the horizon as a control region to estimate the background.
The goal is to select a sample of neutrino-induced upward-going muons
and perform a competitive dark matter search.

Primary author: PRINCIPATO, Cristiana (University of Virginia)

Co-authors: Dr NORMAN, Andrew (Fermilab); Mr ALIAGA SOPLIN, Leonidas (College of William and Mary); Prof. GROUP, Robert (University of Virginia)

Presenter: PRINCIPATO, Cristiana (University of Virginia)

Session Classification: Dark Matter

Track Classification: Dark Matter