Autumn Institute 2019: Directional Sub-GeV Dark Matter Detection

Report of Contributions

https://agenda.infn.it/e/19972

Contribution ID: **1** Type: **not specified**

An Introduction to Directional Detection

Wednesday 18 September 2019 11:00 (1 hour)

I will give an overview of the physics case and feasibility of directionally detecting WIMP-like dark matter via nuclear recoils. I will introduce and discuss the state of the literature that motivates the field, and mention ongoing work to realise a large-scale directional detector with the ability to discover dark matter below the neutrino floor.

Presenter: O'HARE, Ciaran A. J. (Universidad de Zaragoza, Spain)

Contribution ID: **2** Type: **not specified**

Overview of the Direct Detection of Light Dark Matter

Tuesday 17 September 2019 14:30 (1 hour)

I'll give an overview of the process of dark matter scattering on electrons, which allows direct detection experiments to probe below the GeV scale. In particular, I'll review the theory framework's currently in use in the literature and highlight areas where progress is still needed.

Presenter: MCCABE, Christopher (King's College London)

Contribution ID: **3** Type: **not specified**

Overview of the International CYGNUS Collaboration Project and of the Italian CYGNO/INITIUM Effort

Tuesday 17 September 2019 11:00 (1 hour)

We are going to discuss the physics reach and the experimental challenges of directional WIMP-like Dark Matter searches, illustrating the concept of the CYGNUS-TPC international collaboration and how the CYGNO effort fits into it. We are going to present the latest R&D results in the field and discuss future short and long term developments of such techniques, also in the context of solar Neutrinos measurements.

Presenter: BARACCHINI, Elisabetta (GSSI)

Contribution ID: **4** Type: **not specified**

How Scatterings affect the Dark Matter Velocity Distribution in the Laboratory

Wednesday 18 September 2019 14:30 (1 hour)

Direct detection experiments are looking for rare interactions between dark matter (DM) particles from the galactic halo and atoms of a detector. For larger cross sections, such scatterings can also occur before the DM particle enters the laboratory. I will discuss the phenomenological implications of "pre-detection"scatterings inside the Earth and Sun, and how they can both extend and reduce the sensitivity of terrestrial DM searches.

Presenter: EMKEN, Timon