Neutrinos as the Dark Matter particle

**Neutrino Physics in the Context of Dark Matter**

Miguel D. Campos, on behalf of the theory section of the Lindner division, Max-Planck-Institut fur Kernphysik, Heidelberg, Germany.

**Theoretical Aspects**

**Problem**

To thermalize sterile neutrinos after they have been produced through known mechanisms, in order to ease tensions with X-ray constraints.

**Idea**

Thermalization increases the sterile neutrino number density, which reduces the needed value of the mixing angle to produce the right relic abundance.

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**Experimental Aspects**

**Problem**

Lack of an experimental method to detect sterile neutrinos.

**Idea**

To use electron recoil data coming from liquid xenon experiments in order to constrain the sterile neutrino parameter space.

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**Neutrinos as the Dark Matter Portal**

Based on arXiv:1804.09660 [HEP-PH], by Thomas Hugle, Moritz Platscher and Kai Schmitz

**Problem**

To constrain dark matter models in which heavy right-handed neutrinos play the role of a portal with the visible sector using indirect detection techniques.

**Idea**

6 years observation of glows (2008 - 2014) H.E.S.S., 10 years observation of the GC (2004 - 2014; 112 hs live time) Neutrino masses at one-loop, due to $\mu \neq 0$.

**Leptogenesis** occurs in the strong washout regime and is very similar to standard thermal leptogenesis in the type-I seesaw model, where low mass scales are not accessible.

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**Neutrinos, Dark Matter & Leptogenesis**

Based on arXiv:1804.09560 [HEP-PH], by Thomas Hugle, Mortiz Platscher, and Kai Schmitz

**Problem**

Lack of an experimental method to detect sterile neutrinos.

**Idea**

To generate leptogenesis through the scotogenic neutrino mass model, for right-handed neutrino masses at the TeV scale.

Neutrino masses at one-loop, due to $\mu \neq 0$.

Dark matter, using the lightest $Z_2$ odd state.

Sizeable baryon asymmetry, through $N_1 - N_2$ interactions.

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**Experimental Apects**

Based on Phys.Rev. D94 (2016) no.9, 095010, by Miguel D. Campos and Werner Rodejohann

**Problem**

To use electron recoil data coming from liquid xenon experiments in order to constrain the sterile neutrino parameter space.

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