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Dark matter searches with IceCube

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The construction of the IceCube neutrino observatory is practically terminated. With 79 strings taking data out of the 86 foreseen, we are one deployment season away from completion. The detector, however, has been taking data since 2006 in different partial configurations. We have evaluated these data for evidence of dark matter annihilations in the Sun, in the Galactic Center and in the Galactic Halo, searching for an excess neutrino flux over the expected backgrounds.

In this talk I will review the results of dark matter searches for WIMPs, Kaluza-Klein modes and superheavy candidates (Simpzillas), using past configurations of IceCube. The results are presented in the form of muon flux limits and constraints on the candidates' spin-dependent cross-section with protons, showing that IceCube is competitive even with direct search experiments in certain mass regions.

Moreover, the low-energy extension of IceCube, Deep-Core, which was commissioned earlier in 2010, offers exciting opportunities for dark matter searches down to candidate masses in the physically interesting region of about 50 GeV. I will also discuss the anticipated capabilities of the complete IceCube detector array in the search for dark matter.

Auteur principal: DE LOS HEROS, Carlos (Uppsala University)

Orateur: DE LOS HEROS, Carlos (Uppsala University)

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