

Title: Theoretical Models for Dark Matter: from WIMPs to Primordial Black Holes

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Abstract: <p>Among the many candidates proposed to explain the nature of Dark Matter, WIMPs have been the most supported in the last decades, because of their success in a natural explanation of the current Dark Matter abundance and their ubiquitous presence in models addressing the hierarchy problem.<br>

Other candidates that have been attracting some attention recently are Primordial Black Holes, which would have formed in the early history of the universe.<br>

In my talk I will touch on both frameworks for the explanation of Dark Matter.<br>

As for WIMP candidates, I will discuss the interplay between their experimental searches and theoretical frameworks. On the side of Effective Field Theories, I propose a method to use them consistently for the recast of collider searches. On the side of simplified models, in the presence of apparent gauge anomalies at low energies I highlight the enhanced reach of indirect searches.<br>

In the last part I will illustrate a model for the generation of PBHs relying on a feature already present in the Standard Model, the metastability of the Higgs vacuum. Another signature of this remarkable property of the SM could be the generation of a background of gravitational waves.<br>

The observation of either of these signatures would represent a spectacular confirmation of the metastability of the Higgs vacuum.</p>

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