

Determination of dark matter properties at high-energy colliders

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If the cosmic dark matter consists of weakly interacting massive particles, these particles should be produced in reactions at the next generation of high energy accelerators. Measurements at these accelerators can then be used to determine the microscopic properties of the dark matter. From this, we can predict the cosmic density, the annihilation cross sections, and the cross sections relevant to direct detection. In this paper, we present studies in supersymmetry models with neutralino dark matter that give quantitative estimates of the accuracy that can be expected. We show that these are well matched to the requirements of anticipated astrophysical observations of dark matter. The capabilities of the proposed International Linear Collider (ILC) are expected to play a particularly important role in this study.

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