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Consolidating secluded sectors with the Higgs-Portals

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Secluded sectors containing self-interacting Dark Matter offer a compelling framework for explaining dark matter production through interactions confined within the dark sector. Introducing a feeble coupling between the dark and visible sectors via a Higgs portal not only opens up new avenues for detection and enriches thermal production dynamics, but also provides a potential explanation for the initial dark matter population via the freeze-in mechanism. In this talk, I will summarize the freeze-in production of dark matter in scenarios involving self-interactions. I will emphasize how variations in dark sector interactions can either tighten or relax cosmological constraints, leading to distinct signatures in long-lived particle searches and indirect detection experiments.

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