

Signatures of new scalar particles at future e^+e^- colliders

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A number of astrophysical observations based on gravitational interactions point to the existence of dark matter (DM) in the Universe, which can not be described with the Standard Model (SM). Many of the proposed extensions of the SM, which can provide a dark matter candidate, involve extended scalar sector and new scalar particles which could be produced at future e^+e^- colliders. We studied the case of the Inert Doublet Model (IDM) in detail, where pair-production of new neutral or charged scalars is possible already at 250 GeV collision energy, and the expected signature is mono-Z or W-pair production (where Z or W can be on- or off-shell, depending on the model parameters) and a large missing energy. For low mass benchmark scenarios, high statistical significance of signal observation is expected for the leptonic signature, while for high scalar masses semi-leptonic final state should be considered, as it provides much higher statistics of signal events. We plan to extend our studies to other models with extended scalar sector, as eg. 2HDM+a model, where new interesting signatures are expected.

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