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New approach to DM searches with mono-photon signature

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High energy e^+e^- colliders offer unique possibility for the most general dark matter search based on the mono-photon signature. Analysis of the energy spectrum and angular distributions of photons from the initial state radiation can be used to search for hard processes with invisible final state production.

Most studies in the past focused on scenarios assuming heavy mediator exchange. We notice however, that scenarios with light mediator exchange are still not excluded by existing experimental data, if the mediator coupling to Standard Model particles is very small. We proposed a novel approach, where the experimental sensitivity to light mediator production is defined in terms of both the mediator mass and mediator width. This approach is more model independent than the approach assuming given mediator coupling values to SM and DM particles.

Presented in this contribution are results on the expected sensitivity of the International Linear Collider (ILC) and Compact Linear Collider (CLIC) experiments to dark matter production. The use of beam polarisation can largely improve the sensitivity to DM production scenarios and reduce the impact of systematic uncertainties. Precision of mediator mass, with and coupling structure determination, in case of the signal observation, is also discussed.

In-person participation

Yes

Primary authors: KALINOWSKI, Jan (University of Warsaw); KOTLARSKI, Wojciech (National Centre for Nuclear Research, Warsaw, Poland); MEKALA, Krzysztof (University of Warsaw); ZARNECKI, Aleksander Filip (Faculty of Physics, University of Warsaw); ZEMBACZYNSKI, Kamil (Faculty of Physics, University of Warsaw)

Presenter: MEKALA, Krzysztof (University of Warsaw)

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