

Dark matter production with light mediator exchange at future e+e- colliders

Monday 28 February 2022 15:20 (15 minutes)

One of the primary goals of the proposed future collider experiments is to search for dark matter (DM) particles using different experimental approaches. High energy e+e- colliders offer unique possibility for the most general search based on the mono-photon signature. As any e+e- scattering process can be accompanied by a hard photon emission from the initial state radiation, analysis of the energy spectrum and angular distributions of those photons can be used to search for hard processes with invisible final state production and to test the nature and interactions of the DM particles.

Production of DM particles at the International Linear Collider (ILC) and Compact Linear Collider (CLIC) experiments was studied using dedicated simulation procedure developed for WHIZARD and the DELPHES fast simulation framework. Limits on the light DM production cross section in a generic model are set as a function of the mediator mass and width, and translated into the limits on the mediator coupling to electrons. If deviations from the Standard Model predictions are observed, mediator mass, width and coupling structure can be constrained from the reconstructed mono-photon event distributions.

Primary authors: KALINOWSKI, Jan (University of Warsaw); KOTLARSKI, Wojciech; MEKALA, Krzysztof; ZARNECKI, Aleksander Filip (University of Warsaw); ZEMBACZYNSKI, Kamil (University of Warsaw)

Presenter: ZARNECKI, Aleksander Filip (University of Warsaw)

Session Classification: CET-friendly