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## Using Helicity to Distinguish Dark Matter Models at Lepton Colliders

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Dark Matter has eluded us for decades and continues to do so. Current lepton colliders are currently being used to set exclusion limits on coupling constants and masses of various dark matter models, but many models would have either identical or too close to distinguish signals in a detector. There is hence a need for methods/observables to separate the signals. We look into whether measuring the helicity of the photon in  $e^+e^-$  processes with a single outgoing photon plus missing energy, can be used to distinguish two dark matter models: Dark Photon and Axion-Like-Particles (ALPs). It was found that for the limitations of the Belle II detector, the SM background is close to 50% independent of  $\cos\theta_\gamma$ . This means that any alteration to this, either in total left-right photon helicity asymmetry or  $\cos\theta_\gamma$ -dependence can be used as a beyond-standard-model (BSM) signal.

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Beyond the Standard Model

**Primary author:** ERNER, Sofie (PhD student at IPPP at Durham University)**Co-author:** Dr BAUR, Martin**Presenter:** ERNER, Sofie (PhD student at IPPP at Durham University)**Session Classification:** Poster Session and Dinner