

SYNERGIES TOWARDS THE FUTURE STANDARD MODEL

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BSM Higgs physics at the Photon collider

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High-energy $\gamma\gamma$ - and $e\gamma$ -collisions offer a rich phenomenological programme, complementary to e^+e^- collisions at a linear collider both in kinematic as well as physics reaches. In particular, $\gamma\gamma$ collisions offer a unique setting to investigate properties of the Higgs boson(s). High polarisation of the photon beams (produced via Compton back-scattering) can be achieved and adjusted by flipping the polarisation of the incident laser. Furthermore, prospects for di-Higgs production at a $\gamma\gamma$ collider are particularly promising, and could open the way to a direct measurement of the trilinear Higgs self-coupling, at lower centre-of-mass energies than at an e^+e^- collider.

In this talk we will present new results about the di-Higgs production process at the $\gamma\gamma$ collider, comparing different running scenarios (with different types of incident laser). We will discuss the possibility of measuring the trilinear Higgs coupling, also making use in this context of photon polarisations to disentangle different contributions to di-Higgs production.

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