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Search for dark photons at low energy e-gamma collider

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We study a possibility of neutral pion and dark photon production at a high-luminosity photon-electron collider with the energy of the photon about 20 MeV and the energy of the electron about 1 GeV.

The neutral pion production channel is Primakoff-type via the t-channel photon exchange.

The dark photon production channel is similar to the timelike Compton scattering on the electron.

We developed the Monte Carlo generator and used it to estimate the signal feasibility and to investigate the event distributions affected by a realistic smearing of the photon and electron beams.

We estimate the luminosity of the photon-electron collisions required to measure the pion decay width with 1% error and to set a limit on dark photon coupling parameter ϵ for the dark photon mass below 250 MeV competitive with the current and future experiments.

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