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Low energy gamma-gamma collider for QED measurements

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Advanced Compton back-scattering sources under development for nuclear physics and photonics are enabling a new generation of gamma ray beams of high brilliance, which in turns allow now to conceive a low energy collider of photon beams in the 0.5-3 MeV center of mass energy range, with luminosity in the 10^25-10^26 s^-1cm^-2 range, just enough to generate a few events per day of elastic photon-photon scattering and a few tens of events per second of Breit-Wheeler (pair production in vacuum, i.e matter creation from light). None f these fundamental and long time predicted QED processes have been experimentally observed so far. An overview of other technologies possibly usable for these investigations will be discussed, based on high intensity lasers or high power bremsstrahlung sources or FEL's, and the uniqueness of Compton back-scattered based gamma-gamma collider in attaining the requested luminosity will be shown.

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