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Puzzling enhancement of soft photons: use and misuse of the Low theorem

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A puzzling enhancement of soft photons has been observed since the 80s in data for small-k_T direct photons, associated with multi-particle hadron production and with jets in e^+-e^- annihilation. As a reference for comparison was used the "bremsstrahlung" mechanism, assuming radiation of photons by the produced charged particles.
This model usually presented as a generalization of the Low theorem, has in fact no relation to diffractive photon radiation, considered by Low. We prove the Low theorem in terms of Weizs\"acker-Williams representation, and perform calculations employing the Good-Walker mechanism of diffraction. Inclusive production of direct photons in hadronic collisions is calculated within the color-dipole phenomenology, with the dipole cross section adjusted to HERA data. The pp elastic amplitude at the energies of LHC is known to be close to the unitarity bound, increasing the number of cut Pomerons. This gives an additional enhancement by factor 4-5 for the photon production rate due to so called AGK cancellation and lack of absorptive corrections. On the contrary to the unjustified bremsstrahlung mechanism we describe
formation of jets in e^+-e^- annihilation as the process of regeneration of the gluonic and electric fields of the highly virtual $q\bar{q}$ pair.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

Maybe

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