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Anomalous soft photon production from QCD vacuum polarization

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Anomalous soft photon production beyond that predicted by standard Bremsstrahlung calculations is a ubiquitous feature in high energy processes, from $e+e-$ to heavy ion collisions. We calculate the electromagnetic current due to the QCD vacuum polarization induced by the $q\bar{q}$ jets in $e+e-$ annihilation using the Schwinger model, and source Maxwell's equations with it. The predicted soft photon emission reproduces the DELPHI Collaboration's observations in $e+e-$ annihilation, exhibiting several times the signal expected from traditional Bremsstrahlung radiation. We will discuss the implications of our results for the soft photon production in heavy ion collisions.

Primary author: ILANY, Joshua (Department of Physics and Astronomy, Stony Brook University, Stony Brook, New York 11794-3800, USA)

Co-author: KHARZEEV, Dmitri (Stony Brook U./BNL)

Presenter: ILANY, Joshua (Department of Physics and Astronomy, Stony Brook University, Stony Brook, New York 11794-3800, USA)

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