Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Anomalous soft photon production from the induced currents in Dirac sea FRASHER LOSHAJ, DMITRI KHARZEEV, Stony Brook University — The propagation of a high energy quark distrurbs the confining vacuum inducing the currents in Dirac sea. Since quarks possess electric charge, these induced vacuum currents act as a source of soft photon radiation. This can lead to the enhancement of the soft photon production above the expectations based on the charged hadron yields and the Low theorem. We illustrate the phenomenon by using the exactly soluble $1+1$ dimensional massless Abelian gauge model that shares with QCD all of the ingredients involved in this mechanism: confinement, chiral symmetry breaking, axial anomaly, and the periodic θ-vacuum. We show that the propagating quark throughout the process of hadronization induces in the vacuum charged transition currents that lead to a strong resonant enhancement of the soft photon yield; the Low theorem however remains accurate in the limit of very soft momenta. We then construct on the basis of our result a simple phenomenological model and apply it to the soft photon production in the fragmentation of jets produced in Z^0 decays. We find a qualitative agreement with the recent result from the DELPHI Collaboration.

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Date submitted: 10 Jun 2013 Electronic form version 1.4