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# PHENIX beam energy and centrality dependence of direct photon emission in heavy ion collisions

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Direct photon measurements provide a unique tool to study the strongly coupled QGP produced in heavy ion collisions and its evolution to hadron resonance matter. PHENIX has observed that a large number of direct photons are radiated during the evolution of the system created in Au+Au collision at 200 GeV, and that the photons are emitted with a large azimuthal anisotropy. The theoretical models of thermal radiation are qualitatively consistent with the data, but the simultaneous observation of large yield and flow strength are difficult to reconcile quantitatively.

In order to provide new insights, PHENIX is analyzing new data from 39, 62.4, and 200 GeV Au+Au collisions and from Cu+Cu collisions at 200 GeV. We find a new scaling behavior, the photon yield  $dN^\gamma/d\eta$  is proportional to  $(dN_{ch}/d\eta)^\alpha$ . The scaling holds for beam energies measured at RHIC and LHC, for centrality selected samples, as well as for different collision systems. In this talk we will discuss these new results and their implications. We will also show updated results on direct photon yields and azimuthal anisotropies  $v_2$  and  $v_3$  from high statistics Au+Au data at 200 GeV.

## Content type

Experiment

## Collaboration

PHENIX

## Centralised submission by Collaboration

Presenter name already specified

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