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Probing collision dynamics of small system collisions via high p_T hadrons and direct photons by the PHENIX experiment at RHIC

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The recent finding of collective behavior of particles emitted in small system collisions calls for reexamination of such systems to determine whether or effects beyond the initial state nuclear effects play a significant role.

High p_T hadrons from jets and direct photons have been powerful probes to explore the dynamics of the heavy ion collisions, since they are produced at the early stages of the collisions. While photons do not interact strongly and therefore escape the medium largely unmodified, the high p_T hadrons originate from color charged objects that lose significant energy while traversing the medium. Taken together, these provide significant evidence in support of QGP formation in heavy ion collisions. Measurements of these two probes in small system collisions may provide insight to the dynamics of small collision systems and help assess their apparent similarity to heavy ion collisions.

PHENIX has measured mid to high p_T hadrons over wide range of rapidity in $p/d/{}^3\text{He}+A$ collisions. PHENIX also has measured direct photons in $p/d+A$ collisions. In this talk, the latest results on the high p_T hadrons and direct photons are presented and the possible additional effects explored by these probes will be discussed.

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