

# Quark Matter 2019 - the XXVIIIth International Conference on Ultra-relativistic Nucleus-Nucleus Collisions



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## Modification of hadron productions in small systems observed by PHENIX

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Collisions of small systems exhibit evidence of collective behavior through various flow type measurements, which suggests that quark gluon plasma could be produced in these collisions. If so, there could also be evidence for energy loss in the plasma, which would present itself in the spectra of hadrons. PHENIX has studied the nuclear modification factor  $R_{AB}$  of various hadron species at central and forward/backward rapidities. We measured  $\pi^0$ s in the central rapidity region  $|\eta| < 0.35$  in  $p$ +Au,  $d$ +Au and  $^3\text{He}$ +Au collisions at 200 GeV. For central collisions, the  $R_{AB}$  shows an ordering with collision system size with a pronounced peak in the range  $2 < p_T < 7$  GeV/c in  $p$ +Au. This peak decreases in magnitude as the projectile size increases. At higher  $p_T$ ,  $R_{AB}$  is below unity and converges towards a common value. We observe a similar centrality dependence for all three systems. The  $R_{AA}$  of  $\phi$  mesons has been measured at forward, backward, and central rapidities in  $p$ +Au and  $^3\text{He}$ +Au collisions. The implications of the combined results for the role of initial and final state effects will be discussed.

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