

# Event activity dependence of heavy flavor and quarkonium production in small collision systems

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Open heavy flavor and quarkonium are valuable probes to identify the underlying QCD dynamics behind high multiplicity events at RHIC and LHC. The origin of collective flow found in small collision systems ( $p + p$  and  $p + A$ ) is still under debate, but the initial state interaction (gluon saturation) could be a significant source, giving high charged multiplicity. Recent LHC data on the event activity dependence of quarkonium ( $J/\psi$ ) yield in small systems have shown that the initial state saturation effect without final state flow effects can describe data quantitatively; this indicates that the initial state saturation effect would provide some constraints on other final state effects. In this talk, I will briefly discuss recent theoretical studies on quarkonium production in small systems in the CGC/small- $x$  saturation framework, a useful tool to examine the QCD dynamics in high multiplicity events. I will also discuss open-heavy flavor ( $D$ ) and its decay lepton ( $c \rightarrow e, \mu$ ) production in small systems as a baseline against quarkonium production.

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