

# Charmonium production in ultra-peripheral heavy ion collisions with two-photon processes

## Summary

We calculate the production of large- $p_T$  charmonium and narrow resonance state (exotic charmonium) in proton-proton, proton-nucleus, and nucleus-nucleus collisions with the semi-coherent two-photon interactions at Relativistic Heavy Ion Collider (RHIC), Large Hadron Collider (LHC), and Future Circular Collider (FCC) energies. Using the large quasi-real photon fluxes, we present the  $\gamma\gamma \rightarrow H$  differential cross section for charmonium and narrow resonance state production at large transverse momentum in ultraperipheral heavy ion collisions. The numerical results demonstrate that the experimental study of ultra-peripheral collisions is feasible at RHIC, LHC, and FCC energies.

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