

Measuring gluon shadowing with prompt photons at RHIC and LHC

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The possibility to observe the nuclear modification of the gluon distribution at small- x (gluon shadowing) using high- p_{\perp} prompt photon production at RHIC and at LHC is discussed. The per-nucleon ratio, $\sigma(p+A \rightarrow \gamma+X)/(A \times \sigma(p+p \rightarrow \gamma+X))$, is computed for both inclusive and isolated prompt photons in perturbative QCD at NLO using different parametrizations of nuclear parton densities, in order to assess the visibility of the shadowing signal. The production of isolated photons turns out to be a promising channel which allows for a reliable extraction of the gluon density, R_G^A , and the structure function, $R_{F_2}^A$, in a nucleus over that in a proton. Moreover, the production ratio of prompt photons at forward-over-backward rapidity in p - A collisions provides an estimate of R_G^A (at small x) over $R_{F_2}^A$ (at large x), without the need of p - p reference data at the same energy.

References

- [1] F. Arleo and T. Gousset, *0707.2944*, submitted to Phys. Lett. **B**.