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Jet and hadron spectra modifications in oxygen-oxygen collisions at the LHC

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The upcoming run of oxygen-oxygen (OO) collisions at the LHC offers unique experimental and theoretical opportunities to address the long standing question of high-momentum rescattering (jet quenching) in small collision systems. We have demonstrated previously that even small energy loss effect can be observed in nuclear modification factor thanks to high precision pQCD baseline calculations in inclusive oxygen-oxygen collisions. However currently there is no pp reference measurement planned at OO collision energy (6.37TeV). Therefore in our recent work we analyzed the reliability of several techniques for computing jet and hadron spectra at different collision energies. We computed the ratio of spectra between different pp collision energies in perturbative QCD, which can be used to construct a reference spectrum. Alternatively, it can be interpolated from measured spectra at nearby energies. We estimate the precision of both strategies for the spectra ratio relevant to the oxygen run. Finally we propose taking the ratio of OO and pp spectra at different collision energies, which cleanly separates the experimental measurement and theoretical computation.

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