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Predictions for future electron-hadron colliders using the Balitsky-Kovchegov equation

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We present the latest predictions for several QCD processes at low-x in the color dipole picture which are of interest for current hadron-hadron and future electron-hadron colliders. The predictions are derived using the solution to the Balitsky-Kovchegov equation for proton and nuclear targets with the collinearly improved kernel and including the impact-parameter dependence. Two different approaches to the nuclear case are studied: a solution obtained using a newly proposed type of initial condition which represents the given nucleus and the solutions based on an initial condition representing a proton coupled to a Glauber-Gribov prescription to obtain dipole-nucleus amplitudes. We study the influence from the different energy evolutions of these two approaches in the following photo-nuclear processes: inclusive and diffractive DIS, coherent production of a J/psi meson in ultra-peripheral collisions at the LHC, and the deeply virtual Compton scattering. By comparison to the available data and to other CGC-inspired models, we demonstrate that the future measurements will be useful to discriminate among different approaches to saturation physics. These studies are therefore of interest for future measurements of QCD dynamics in the region of high parton densities to be performed at the LHC in ultra-peripheral collisions and at future electron-hadron colliders.

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