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Recent results on Quarkonium production from LHC and RHIC

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The study of quarkonium production in nuclear collisions at ultrarelativistic energies is a crucial tool for the determination of the properties of the Quark-Gluon Plasma (QGP) created in such collisions. After a pioneering phase at the CERN SPS, a large amount of results were obtained at the RHIC collider, at a center of mass energy per nucleon-nucleon collisions $\sqrt{s_{\rm NN}} = 0.2$ TeV and, more recently, at the LHC at $\sqrt{s_{\rm NN}} = 2.76$ TeV. In a QGP, the binding of the heavy quark pair (either $c\bar{c}$ or $b\bar{b}$) that forms the quarkonium states is screened by the high density of surrounding color charges, leading to a suppression of the yield of such states. At the same time, re-combination processes involving the heavy quarks may lead to a re-generation of the quarkonia that partly counterbalances their suppression. Ultimately, these studies can provide information on the temperature of the QGP and on its degree of thermalization. In this talk, after an introduction of the main physics concepts, I will review recent experimental results obtained at RHIC and LHC in the study of $c\bar{c}$ (J/ψ and $\psi(2S)$) and $b\bar{b}$ ($\Upsilon(1S)$, $\Upsilon(2S)$ and $\Upsilon(3S)$) states. Most results refer to Au-Au (at RHIC) and Pb-Pb collisions (at LHC), but also heavier (U-U) and lighter (Cu-Cu) systems were investigated as well. Prospects for future studies, and in particular first results, if available, from the LHC Run 2 at $\sqrt{s_{\rm NN}} = 5.02$ TeV, will also be discussed.