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Searching for novel charmed hadrons in relativistic heavy-ion collisions at LHC

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The deconfined quark-gluon plasma (QGP) created in relativistic heavy-ion collisions is not only a perfect fluid with very small η/s but also a most "charming" system with hundreds of charm quarks. Meanwhile, it is widely accepted that the quark hadronization mechanism changes with the appearance of QGP. The production of charmed hadrons differs significantly in A-A collisions from that of p-p and e^+-e^- collisions. The yield of hadrons(including exotic hadrons like tetraquarks, pentaquarks, etc.) with multiple charm quarks would be enhanced through the charm coalescence process in the "charming" QGP medium.
In this talk, we will present our recent studies on the generation of novel charmed hadrons, such as B_c, $X(3872)$, T_{cc}, and $X_{cc\bar{c}\bar{c}}(6900)$ in relativistic heavy-ion collisions at LHC. We study the static properties of those charmed hadrons in vacuum and finite temperature by solving the two/four-body Schroedinger equations. Their yields in heavy ion collisions are investigated dynamically through the transport and coalescence hadronization model. The results show the yield of B_c, $X(3872)$, T_{cc}, and $X_{cc\bar{c}\bar{c}}(6900)$ are order of 1-3 magnitude increased in heavy-ion collisions. This provides a new avenue for scientists to observe/discover those charmed hadrons in the experiment.

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