**$\Lambda_c$ enhancement from strongly coupled quark-gluon plasma**

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Because of the strong attractive color-spin interaction between two quarks in the flavor anti-triplet and color anti-triplet channel, the [ud] diquark has played an important role in the structure of hadrons. Assuming that stable bound diquarks also exist in strongly coupled quark-gluon plasma that is produced in relativistic heavy ion collisions, we have studied their effects on the yield of $\Lambda_c$ in these collisions [1]. Based on the quark coalescence model for hadron production from the quark-gluon plasma, we have calculated the contributions to $\Lambda_c$ production from both the normal three-body coalescence of independent c, u and d quarks and the two-body coalescence of the c quark and the [ud] diquark. The resulting $\Lambda_c$ to the $D^0$ yield ratio, which is the same in heavy ion collisions at the Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC), is shown in Fig. 1 for different scenarios as a function of the temperature of the quark-gluon plasma. It is seen that the $\Lambda_c/D^0$ ratio at the critical temperature $T_C = 0.175$ GeV is about 0.11 without diquarks and increases to about 0.44 in the presence of the diquark [ud] with mass $m_{[ud]} = 0.6$ GeV (thin solid line), corresponding to a loosely bound state which can hardly exist near $T_C$. If the diquark mass has the minimum value $m_{[ud]} = 0.455$ GeV (bold solid line) due to the attractive color-spin interaction, the $\Lambda_c/D^0$ ratio becomes even larger and has a value of about

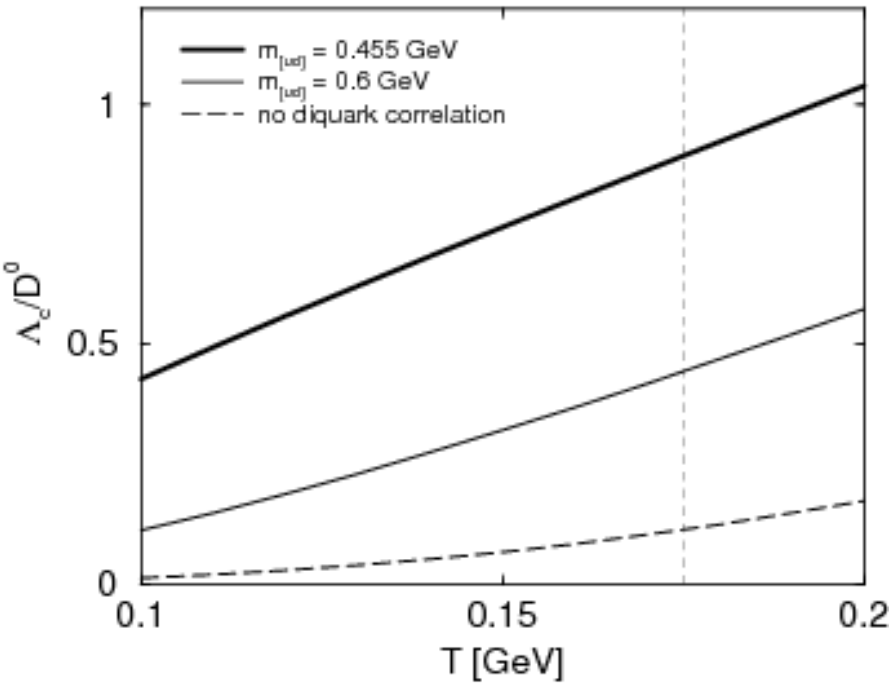


**Figure 1.** Yield ratio $\Lambda^c/D^0$ as a function of temperature.

0.89. Therefore, the diquarks in quark-gluon plasma raise the $\Lambda_c/D^0$ratio by about a factor 4 - 8 in comparison with the case without diquarks. A similar enhancement is found for the $\Lambda_b/B^0$ ratio between bottom baryons and bottomed mesons. The study of $\Lambda_c/D^0$ and $\Lambda_b/B^0$ enhancements in relativistic heavy ion collisions would thus open a new way to find the existence of QGP in heavy ion collisions and also provide an experimental tool to probe the diquark correlation in quark-gluon plasma. This would, in turn, confirm the diquark structure in heavy baryons with a single heavy quark.

[1] S. H. Lee, K. Ohinish, S. Yasui, I. K. Yoo, and C. M. Ko, Phys. Rev. Lett. **100**, 222301 (2008).