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Probing jet splitting and energy loss via groomed jets in relativistic heavy-ion collisions

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The nuclear modification of groomed jet splitting in relativistic heavy-ion collisions at RHIC and the LHC energies is studied [1] based on the higher twist formalism. Assuming coherent energy loss for the two splitted subjets, a non-monotonic jet energy dependence is found for the nuclear modification of jet splitting function: strongest modification at intermediate jet energies whereas weaker modification for larger or smaller jet energies. Combined with the smaller size and lower density of the QGP medium at RHIC than at the LHC, this helps to understand the groomed jet measurements from CMS and STAR Collaborations: strong modification of the momentum sharing z_g distribution at the LHC whereas no obvious modification of the z_g distribution at RHIC. In contrast, the observed nuclear modification pattern of the groomed jet z_g distribution cannot be explained solely by independent energy loss of the two subjets. The dependence on the angular separation ΔR between two subjets is also studied; it is found that the nuclear modification of z_g distribution decreases with decreasing ΔR but the maximal nuclear modification from CMS energies is always roughly twice of that for STAR energies. Our result may be tested in future groomed jets measurements with lower jet energies at the LHC and larger jet energies at RHIC, for different angular separations between the two subjets.

Reference:

[1] Ning-Bo Chang, Shanshan Cao, Guang-You Qin, arXiv:1707.03767 [hep-ph].

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