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Multi-strange hyperon production at FAIR energies

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Nuclear collisions with beam energies between 5 and 40 A GeV are predicted to produce net-baryon densities which are ≈ 5-6 times higher than normal nuclear matter density. At such high densities, it is expected that baryons start to melt into their constituents, the quarks and gluons, forming a mixed of even deconfined phase. Such collisions will be explored at the upcoming Facility for the Antiproton and Ion Research (FAIR). Multi-strange hadrons will play a major role as diagnostic probes of the of the dense QCD matter. The yields of (anti)hyperons and their relative enhancement with respect to pions have been investigated in heavy-ion collisions at beam energies between 5 and 90 A GeV using the hadronic-string model (UrQMD), hadronic and partonic modes of the transport model (AMPT) and a statistical hadronization model (Therminator). It is found that the yields of multi-strange (anti)hyperons are sensitive to the partonic medium. At beam energies around 10 A GeV - which is the top energy of the FAIR start version - the partonic contribution to the production yield increases strongly with increasing number of (anti-)strange quarks.

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