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Particle production beyond the thermal model

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The statistical hadronization (or thermal) model yields good results when compared to e.g. hadron production rates in LHC heavy-ion data. However, the distribution functions in p_T, rapidity y and eta clearly show deviations from thermal behaviour.

Such non-equilibrium effects can to a certain extent be accounted for in a relativistic diffusion model with three sources - two fragmentation sources, and a mid-rapidity source arising from gluon-gluon collisions - that merges with the thermal model only for time to infinity. Given the short interaction times of AuAu at RHIC or PbPb at LHC, the fragmentation sources still contribute substantially, providing good results when compared to dN/deta distributions for produced charged hadrons from PHOBOS and ALICE, and also for asymmetric systems such as dAu at RHIC and pPb at LHC. The particle content of the sources is investigated as function of sqrt(s_NN) and found to differ substantially for central and fragmentation sources.

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