# Heavy ion collisions at SPS, RHIC, and LHC within a chiral-scale bag model

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**Abstract**

Particle production and space-time evolution of head-on heavy ion collisions at SPS, RHIC, and LHC is considered for the first time with a new kind of constituents - the small massive bags and antibags (Rbag = 0.2 fm, Mbag > 1 GeV) introduced via the Chiral-Scale Bag Model (CSBM - "Upton 1997, Hadron Spectroscopy", 409-412). CSBM does not contain arbitrary parameters and connect radii and masses of the bags (in all possible quantum states) with quark, and gluon condensates. The density and temperature dependences of the condensates allow dynamical formation (decay) of quark-gluon plasma state from (to) these small bags and antibags. On the other hand the small bags are considered in CSBM as almost pure hadron resonance states ($\pi(1300)$, N(1440), ...) which can decay to the other bags and SU(3) hadrons. The SU(3) hadrons are introduced in this model as strongly bounded multibag states - bag-antibag mesons, and bag-bag-antibag baryons. The strong interaction between the small bags is calculated within CSBM and used in quasirelativistic molecular dynamics for description of evolution of the hadron matter in the heavy ion collisions with corresponding clusterization to the final multibag SU(3) hadron states.

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