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Hot and dense matter theory

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Ultra-relativistic heavy ion reactions provide a tool to study the collective properties of extreme states of matter, of the Quark Gluon Plasma. Collective flow dynamics is one of the most dominant observations and enables us to draw conclusions on the Equation of State, on the transport properties and of the phase structure and transitions of the matter. The collective elliptic flow scales with number of constituent quarks in the emitted particles indicating that the flow developed in the Quark Gluon Plasma phase. The subsequent hadronization is rapid, and happening together with the final freeze out of the emitted hadrons. On the other hand there are hints that hadronization goes through a Quarkyonic matter phase, where first deconfinement and then chiral symmetry ceases.

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