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Spin-offs from the rapid, volume hadronization of QGP applied at other scales for transitions in extreme hot and dense matter

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By now there is ample experimental and theoretical evidence that in high energy heavy ion reactions the Quark Gluon Plasma hadronizes in a very rapid transition, where most of the hadronization hypersurface or layer has a time-like normal. Thus the neighboring points of this surface are not causally connected to each other, and so collective pressure driven instabilities cannot develop. This process is naturally described by relativistic fluid dynamics.

Rapid, simultaneous phase transitions or ignition in most of the volume of the material are important and vital problems in many fields of research and technology. Present laser and nano technology make radiation dominated, relativistic, rapid events possible at larger scales. This enables experimental and theoretical studies of rapid, volume transitions and phase transitions for extreme hot and dense matter.

One example for pico second, laser pulse induced, simultaneous ignition for pellet fusion is presented. Methods taken from nano-plasmonics, will be shown to enable us to achieve this simultaneous ignition, with moderate compression and enhanced light absorption. Consequently, mechanical, pressure driven Rayleigh-Taylor instabilities, preventing stable volume ignition up to now, will not have time to develop and whole volume ignition can be achieved.

Content type

Theory

Collaboration

Centralised submission by Collaboration

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