

Search for new phases of the strongly interacting matter at ATLAS LHC

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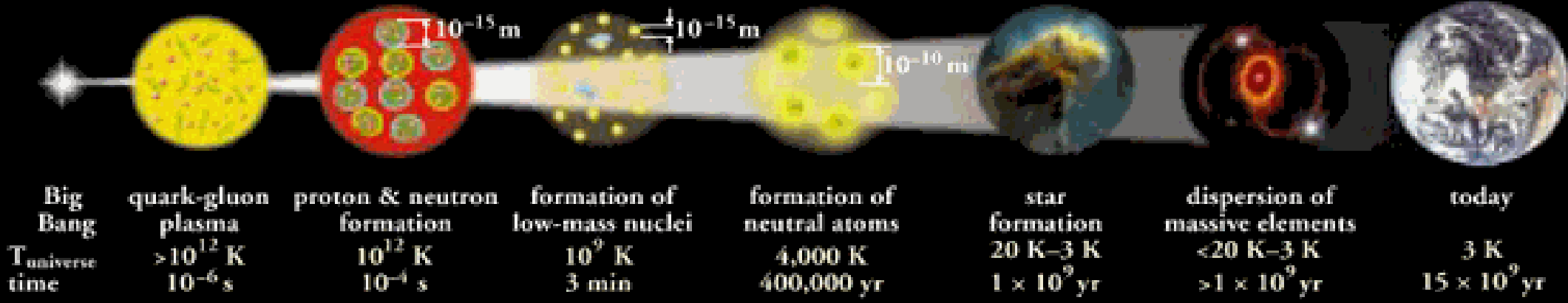
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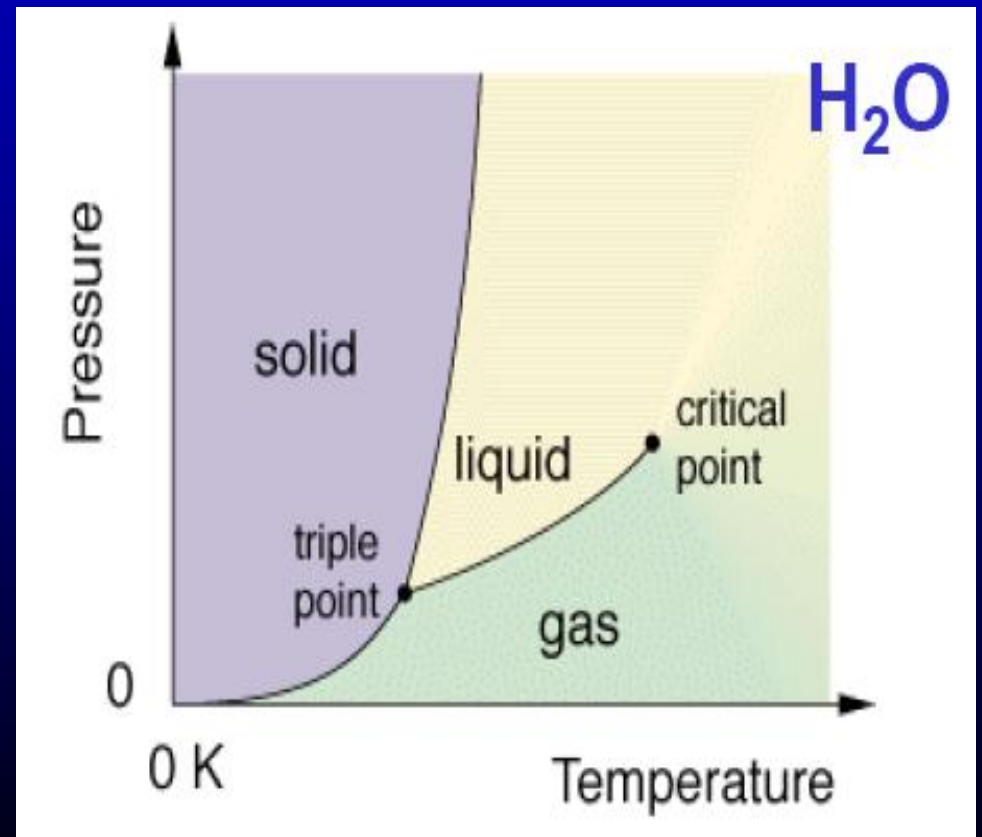
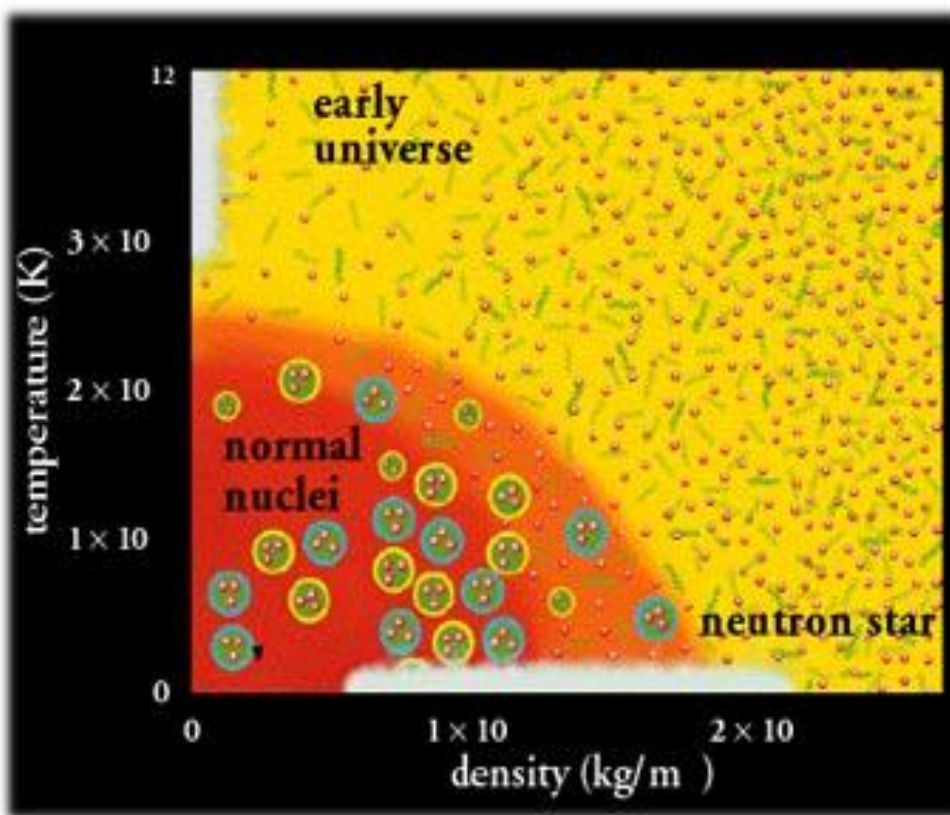
Introduction

Over the last 30 years a lot of efforts have been made to search for new phases of strongly interacting matter under extreme conditions of high temperature and/or baryon density, as predicted by Quantum Chromodynamics .

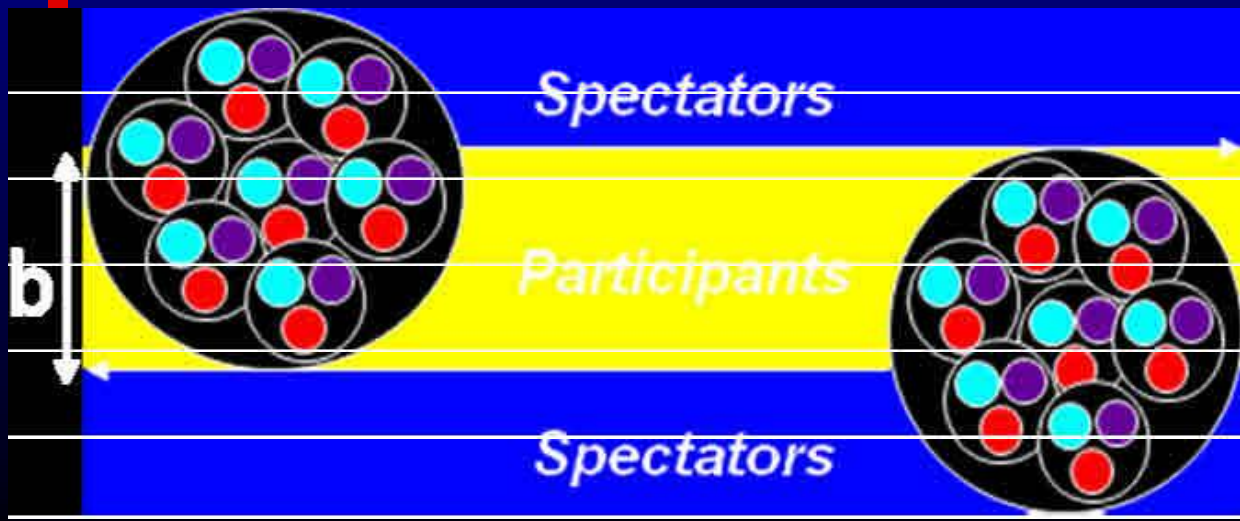
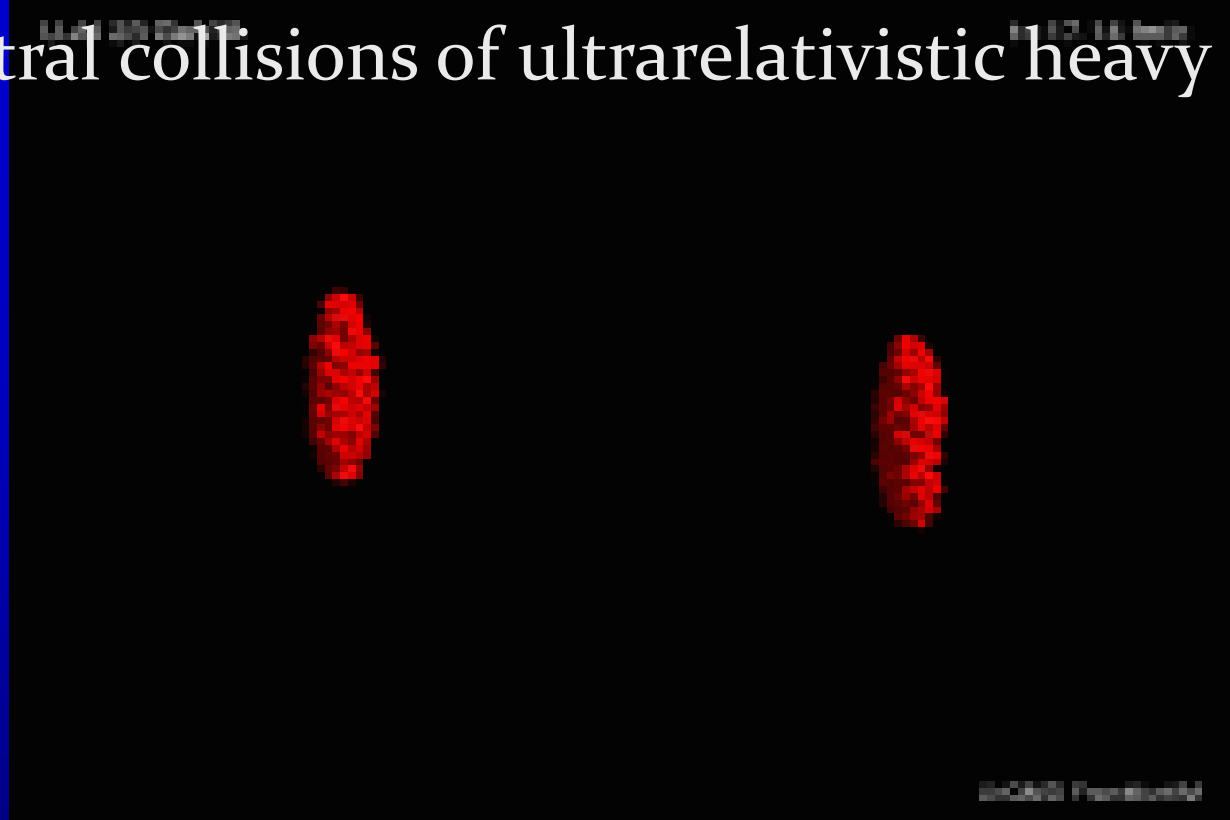
These Phases are relevant for understanding the evolution of the early Universe after Big Bang, the formation of neutron stars.



$$T_c \approx 150 \text{ MeV} ; \rho \approx 7-10 \rho_0.$$



Central collisions of ultrarelativistic heavy ions



Activity of our lab.

Search for signal on :

- *deconfinement at ultrarelativistic heavy ion collisions (Nuclear Physics B (Proc. Suppl.) 177–178 (2008) 341–342); Acta Phys.Polon.Supp.1:405-406,2008)*
- *mixed phase at the JINR Nuclotron. (Phys.Part.Nucl.Lett.5:1-6,2008);*
- *central nucleus-nucleus collisions at relativistic energies (Chinese Physics C. Vol. 34, No. 8, pp. 1076-1081, 2010 ; Chine Physics C, vol. 35, N 12 , pp.1095-1099 (2011) ;Azerbaijan Journal of Physics, vol.XVI, № 1, 2010, pp.75-78; vol.XVI, № 3-4, 2010 pp.85-88.; Azerbaijan vol.XVI, № 2, 2010, pp.470-473)*
- *QCD Critical Point in Central Nucleus-Nucleus Collisions (Indian Journal of Physics vol.87, N7 pp. 1047-1050 2011);*
- *intermediate baryon systems formation in hadron-nuclear and nuclear-nuclear interactions at high energies. (J.Phys.Conf.Ser.110:122007,2008.)*
- *light nuclei production in heavy ion collision (Azerbaijan Journal of Physics, vol.XVI, № 2, 2010, pp. 474-477)*
- *NUCLEAR TRANSPARENCY EFFECT IN THE STRONGLY INTERACTING MATTER. (Azerbaijan Journal of Physicsvol. XVII №3 pp. 17-20 (2011))*
- *collective behavior of partons (Journal of PoS EPS-HEP2009:406,2009; Journal of Physics: Conference Series 347 (2012) 012024)*

Our plans at Atlas

- to participant in data process of Atlas Heavy Ion collisions ;
- to study the properties of central ultrarelativistic heavy ion collisions ;
- to analyses some characteristics of Atlas Heavy ion Collisions as a function of centrality;
- to study some characteristics of heavy quarkonia with limited high values of x (x is Feynman variable)

Heavy quarkonia

heavy quarkonia (a pair of heavy quark and its antiquark) is considered as a hard probe for extracting a signal on Quark Gluon Plasma (QGP) formation. It was demonstrated that heavy quarkonia (J/Ψ) could be produced as a result of coherent interaction. So my research will be focussed to looking for the **correlation** for the quarkonia production in ultrarelativistic heavy ion collisions as a function of the centrality. First we will define the nuclear modification factor (R_{AA}) for heavy quarkonia using the experimental and theoretical data. Then we are going to study its behavior as a function of the centrality to find some central collisions area where the values of R_{AA} function get become $R_{AA} < 1$. In these area we will get the values of correlation function for heavy quarkonia with different values of x .

Thank you very much