



SEMINÁRIO DO LABORATÓRIO DO ACELERADOR LINEAR - FEP

"Using the LHC as a photon collider"

Dr. Daniel Tapia Takaki,
Institut de Physique Nucléaire d'Orsay (CNRS/IN2P3) Université Paris-Sud

25 de março, segunda-feira, Auditório Adma Jafet, IFUSP, às 14h30

The strong electromagnetic fields surrounding the protons and nuclei, accelerated by the LHC, lead to very large cross sections for photon-induced processes. For example, the photonuclear cross section for certain processes in Pb-Pb collisions is larger than the total hadronic one of about 8 b. This makes the LHC the world's most powerful collider not only for protons and lead ions but also for photon-photon and photon-hadron collisions. This seminar will review the physics of ultra-peripheral collisions (UPC) where these photon-induced reactions take place. It will then give ALICE results on coherent J/psi photoproduction and will also cover the prospects of UPC physics using data collected in 2013 proton-lead run. Finally, the LHC upgrade plans on forward physics will also be mentioned.

COLÓQUIO DO DEPARTAMENTO DE FÍSICA MATEMÁTICA – FMA

Nuclear Equation of State (EoS) from High-Energy Scattering Data

Prof. László Jenkovszky (Bogolyubov Institute for Theoretical Physics)

25 de março, segunda-feira, Sala Jayme Tiomno, IFUSP, às 16h

On the basis of the S-matrix formulation of statistical physics, suggested by Dashen, Ma and Bernstein, supplied by high-energy hadron scattering data, an equation of state $p(T)$ is derived. Asymptotically ($T \gg m_p$), the obtained EoS behaves as $p(T) \sim aT^6$, different from the that in the ideal gas, $\sim T^4$, predicted by perturbative quantum chromodynamics (QCD). The coefficient a in front of T^6 has the dimension $[\text{GeV}]^{-2}$, typical of an inverse mass square; it is related to the parameters of high-energy hadron scattering and was calculated by the present author. Physically this means that the hot and dense nuclear matter may not be asymptotically free as predicted by perturbative QCD, instead residual forces between quarks and gluons may survive, with masses of the exchanged particles of the order of 1 GeV. The account for the non-asymptotic contributions results in the EoS $p(T) = cT^4 - bT^5 + aT^6$ with known (positive) coefficients a , b and c . The second (pre-asymptotic) term produces a local metastable state with negative pressure. The presence of metastable states with negative temperature is known also from a modification of the bag EoS (by Kallman et al.). It has far reaching consequences for the hadronic stage in the evolution of the universe by producing exponential expansion of the universe previous or during the confining phase transition.

VIII Encontro da Pós-Graduação Interunidades em Ensino de Ciências

Será realizado o VIII Encontro da Pós-Graduação Interunidades em Ensino de Ciências, de 25 a 27 de março de 2013, no Instituto de Química – USP. Haverá apresentação de trabalhos dos alunos do Programa.

Para mais informações acesse o link <http://web.if.usp.br/cpgi/pt-br/node/27>.

***a**ATIVIDADES DA SEMANA*

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