

Baryon Number- & Strangeness- Dependent Mass Spectrum



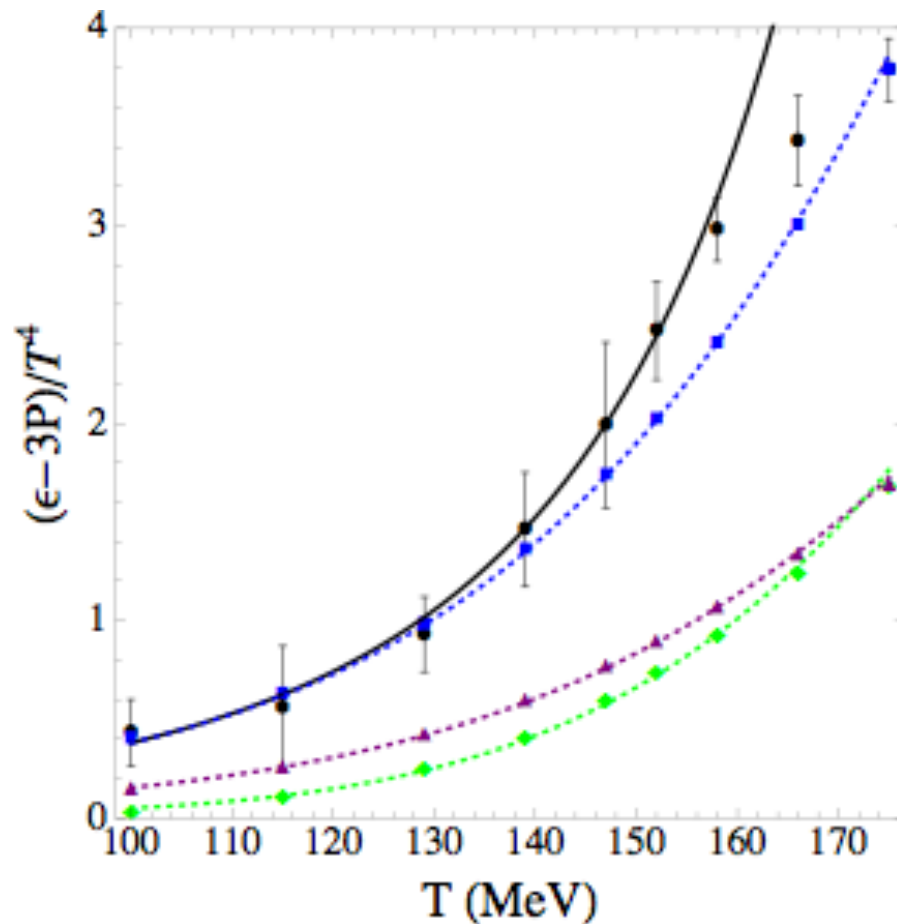
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Workshop on Excited Hadronic States & The
Deconfinement Transition

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Hadron Mass Spectrum from Lattice QCD & Experimental Data



- Exponential mass spectrum fits lattice data (up to ~ 150 MeV)

•Majumder, Müller: Phys. Rev. Lett. 105, 252002 (2010)

- Updated particle data; parameterized exponential fits

•Baryon contribution

•Strange contribution

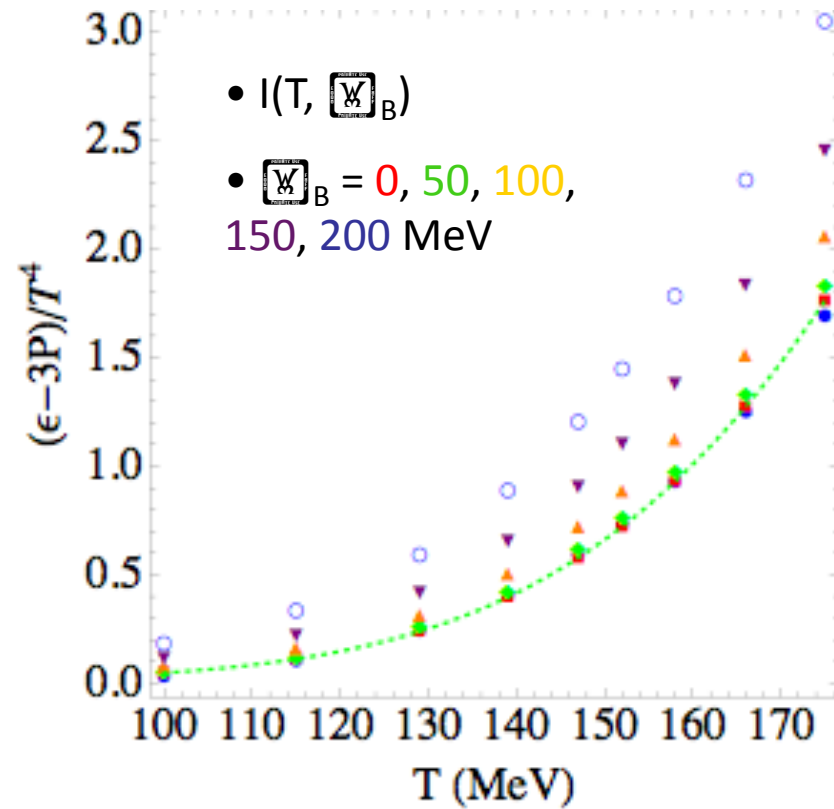
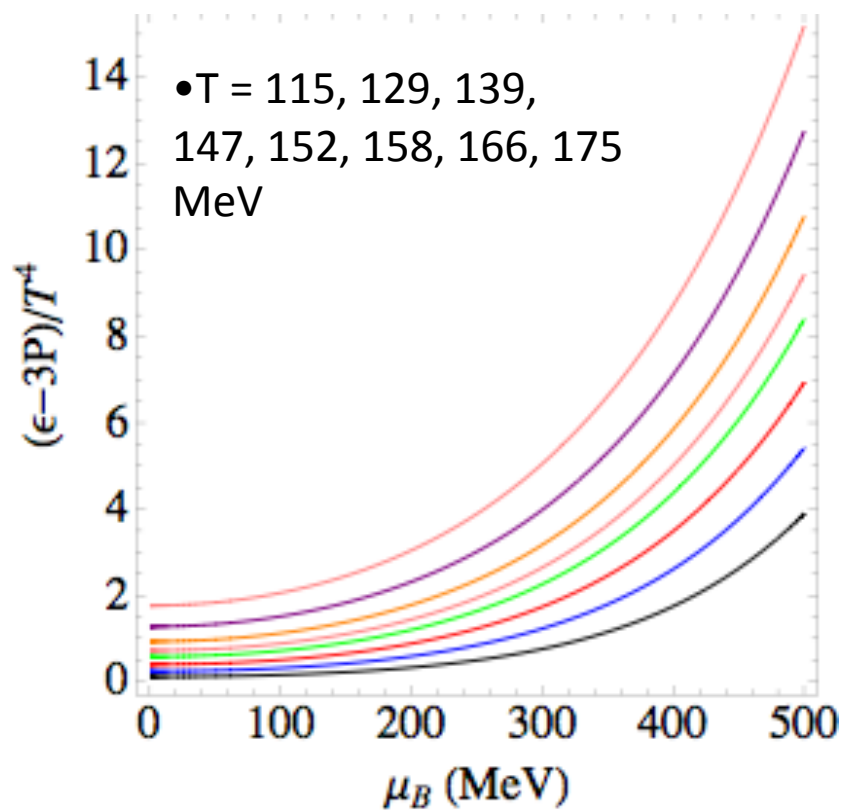
Introduction of baryon chemical potential

$$I_B(T) = \left(\sum_{B_i=1} m \right) \int \frac{d^3 p}{(2\pi)^3 E} (E^2 - p^2) e^{-(E - \mu_B B_i)/T}$$



$$I_B(T, \mu) = 2 \cosh \left(\frac{\mu_B}{T} \right) \sum_{B_i=1} m \int \frac{d^3 p}{(2\pi)^3 E} (E^2 - p^2) e^{-E/T}$$

Dependence on baryon chemical potential





Introduction of strange chemical potential

$$I_S(T) = \left(\sum_{S_i=1} m + \sum_{S_i=2} m + \sum_{S_i=3} m \right) \int \frac{d^3 p}{(2\pi)^3 E} (E^2 - p^2) e^{-(E - \mu_S S_i)/T}$$



$$I_S(T) = \left(2 \cosh\left(\frac{\mu_S}{T}\right) \sum_{S_i=1} m + 2 \cosh\left(\frac{2\mu_S}{T}\right) \sum_{S_i=2} m + 2 \cosh\left(\frac{3\mu_S}{T}\right) \sum_{S_i=3} m \right) \left(\int \frac{d^3 p}{(2\pi)^3 E} (E^2 - p^2) e^{-E/T} \right)$$

Dependence on strange chemical potential

