FLUCTUATIONS AND DECONFINEMENT

SMES

FLUCTUATIONS IN SMES

ENTROPY FLUCTUATIONS AND DECONFINEMENT

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SMES
Basic Assumptions:

MAXIMUM ENTROPY STATE AT EARLY STAGE OF COLLISION

\[ \text{Entropy} \left( \frac{1}{N_p} \right) \text{ Strangeness} \]

\[ \text{Entropy} \quad \text{Strangeness} \rightarrow \text{Conserved during expansion + hadronization} \]

\[ \left( \frac{T^2}{N_p} \right) \cdot E_S \]
FLUCTUATIONS IN SHE'S

BOTH INITIAL QUANTITIES: V AND E

CAN (SHOULD) FLUCTUATE FROM EVENT TO EVENT

FLUCTUATIONS OF V ARE NOT INTERESTING

THUS

LET US ASSUME THAT WE CAN FIX V USING ALL POSSIBLE EXPERIMENTAL TRICKS

THUS FURTHER WE CONSIDER E FLUCTUATIONS FOR FIXED V
ENTROPY FLUCTUATIONS AND DECONFINEMENT
\[ E(V,T) = \varepsilon(T) \cdot V \]

\[ \delta E = V \cdot \frac{d\varepsilon}{dT} \delta T + \varepsilon \delta V \]

I AND II PRINCIPLE OF THERMODYNAMICS

\[ T \delta S = \delta E + \rho \delta V \]

\[ T \delta S = V \frac{d\varepsilon}{dT} \delta T + (\rho + \varepsilon) \delta V \]

\[ (TS = E + pV) \]

\[ \frac{\delta S}{S} = \frac{1}{1 + \frac{p}{\varepsilon}} \cdot \frac{\delta E}{E} + \frac{\delta V}{V} \]
MIXED PHASE
\( p = p_c \)

- IDEAL GAS
- CONFINED MATTER
- QGP

\[ \frac{p}{e} \] vs. \( F [\text{GeV}^{1/2}] \)
ASSUMING $\delta V = 0$ WE GET:

$$\left(\frac{\delta S}{S}\right)^2 \cdot \left(\frac{\delta E}{E}\right)^2 \equiv R_F = \left(1 + \frac{P}{\epsilon}\right)^{-2}$$
ENTROPY TO ENERGY FLUCTUATIONS ($R_F$)

MAXIMUM AT THE END OF THE MIXED PHASE

"THE SHARK"

Graph showing $R_F$ vs $\sqrt{s}$ [GeV].