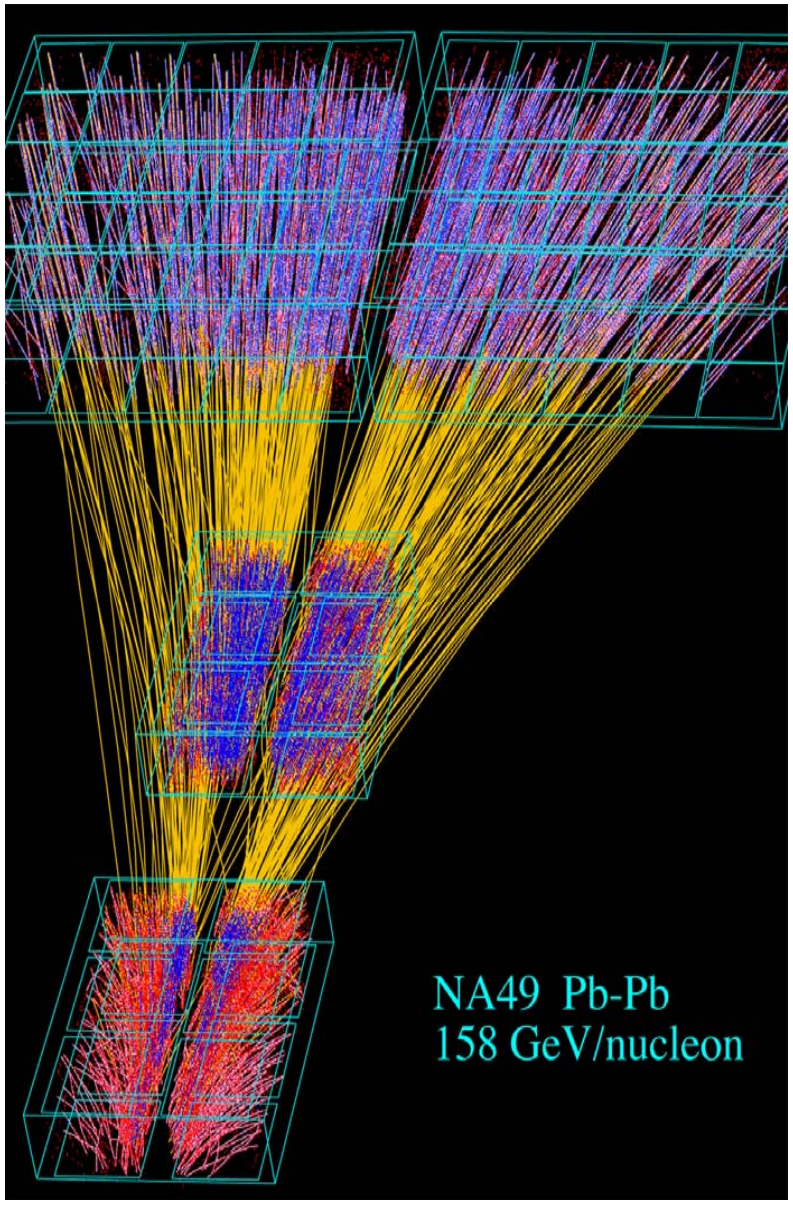
Multiplicity Fluctuations at Dubna Nuclotron

Mark I. Gorenstein

Bogolyubov Institute for Theoretical Physics
Kiev, Ukraine



$$N = 10^2 \div 10^4$$

$$P(N)\,, \quad \langle N^k \rangle = \sum_N N^k\, P(N)$$

$$Var(N) = \langle N^2 \rangle - \langle N \rangle^2$$
$$= \langle (N - \langle N \rangle)^2 \rangle = \langle (\Delta N)^2 \rangle$$

$$\omega = \frac{Var(N)}{\langle N \rangle}$$

Scaled Variances are not equal to each other in different SE

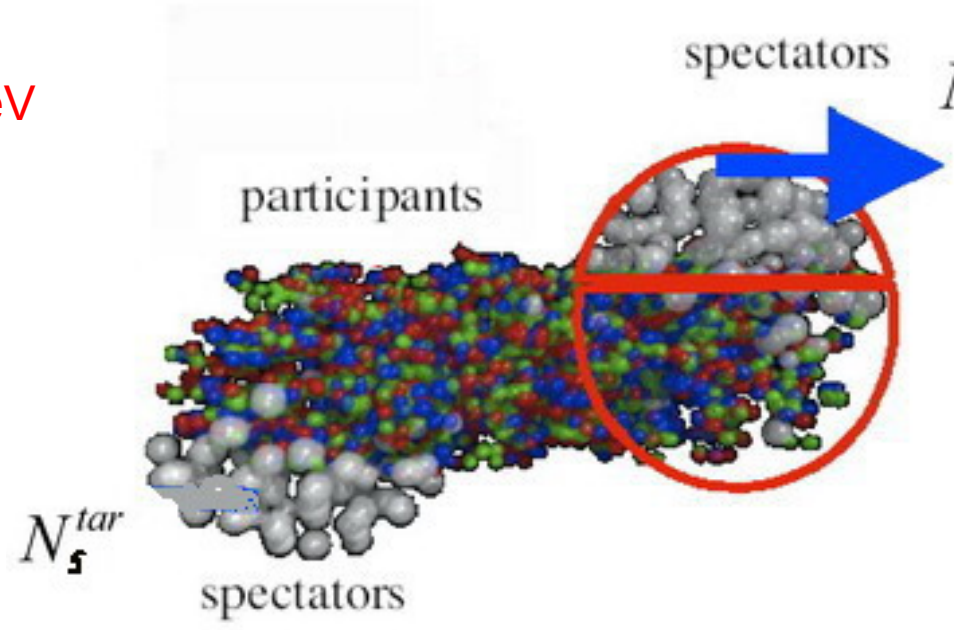
Scaled variance

$$\omega_i = \frac{\langle N_i^2 \rangle - \langle N_i \rangle^2}{\langle N_i \rangle}, \quad \text{where} \quad i = -,+,ch$$

$\omega = 1$ for Poisson distribution

Nucleons: participants and spectators.

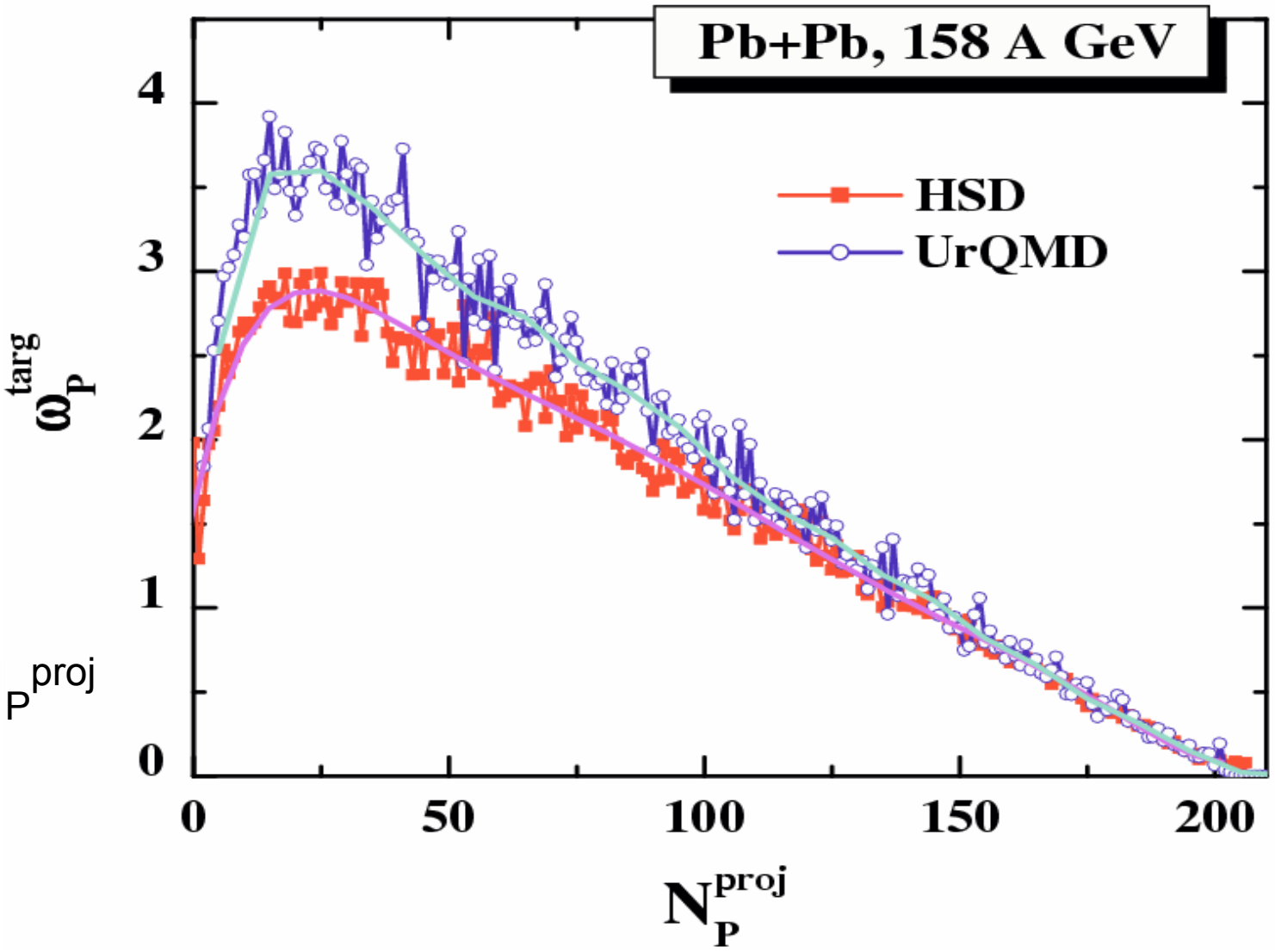
Pb-Pb
158 AGeV



$$N_P^{proj} = A^{proj} - N_S^{proj}$$

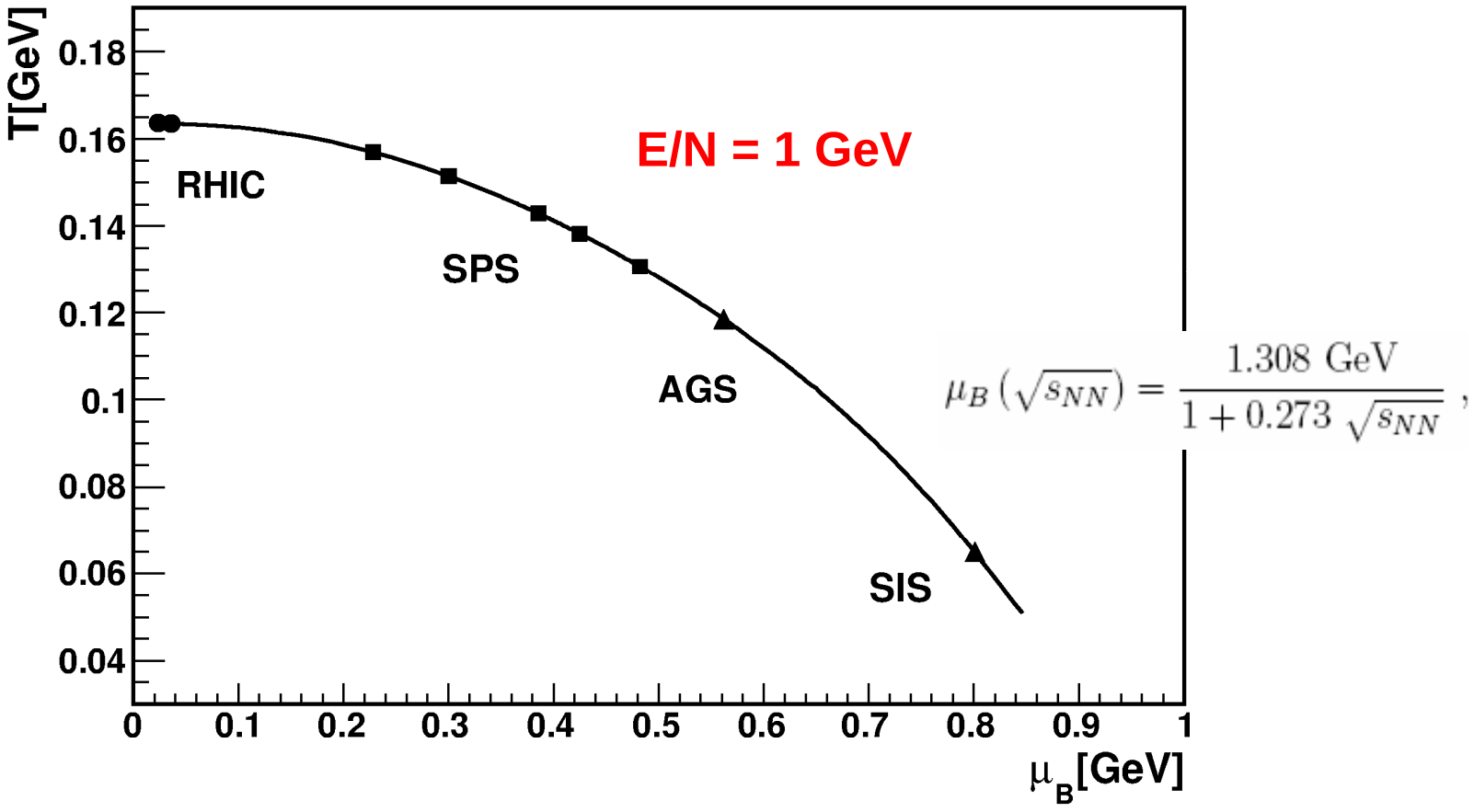
NA49 Measured by ZDC

$\langle N_P^{targ} \rangle = N_P^{proj}$



Konchakovski, Hausler, M.I.G., Bratkovskaya, Bleicher, Stoecker, Phys. Rev. C (2006)

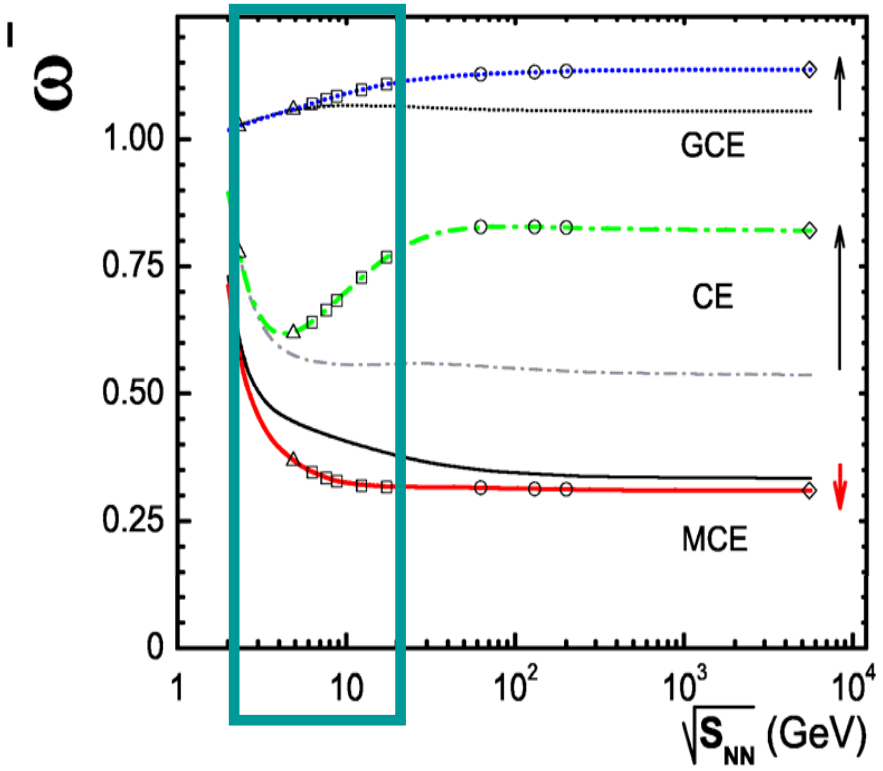
Line of the chemical freeze-out



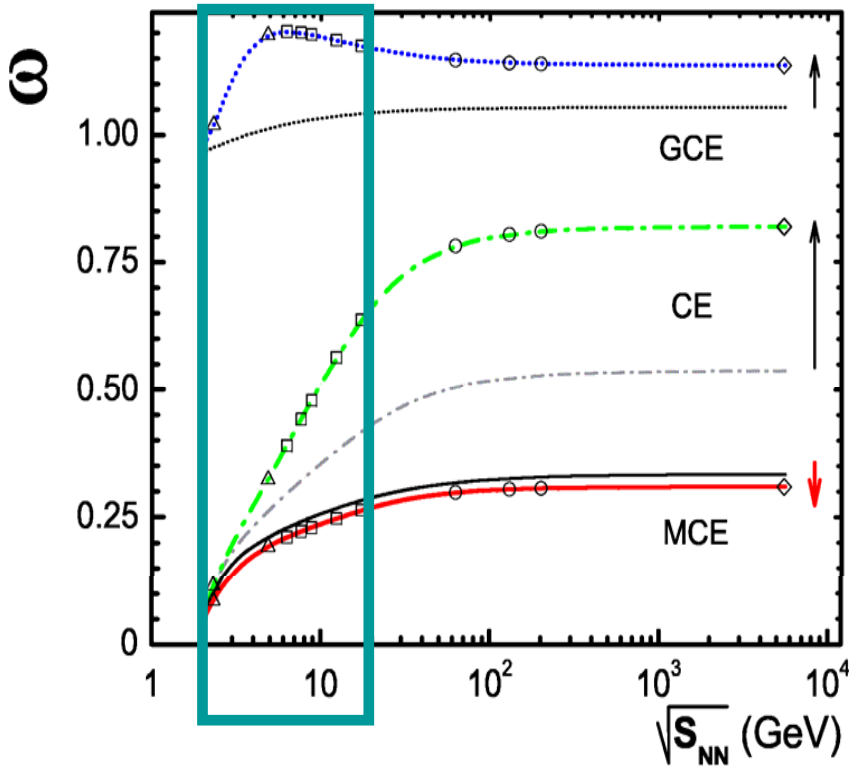
Cleymans and Redlich, Phys. Rev. Lett. (1998)

The prediction of hadron gas model

NICA



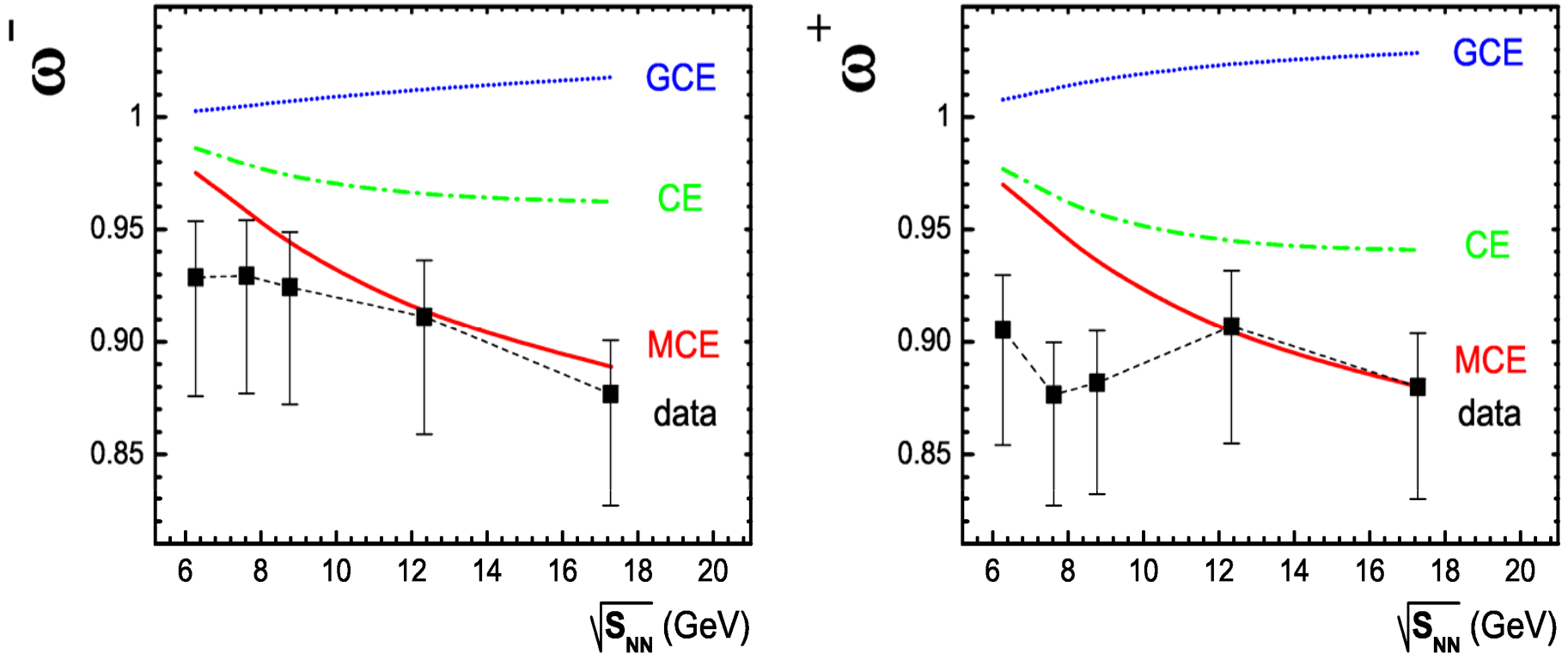
NICA



$$\omega_{4\pi}^{\pm} \equiv \frac{\langle (\Delta N_{\pm})^2 \rangle}{\langle N_{\pm} \rangle} \qquad \omega_{acc}^{\pm} = 1 - q + q\,\omega_{4\pi}^{\pm}$$

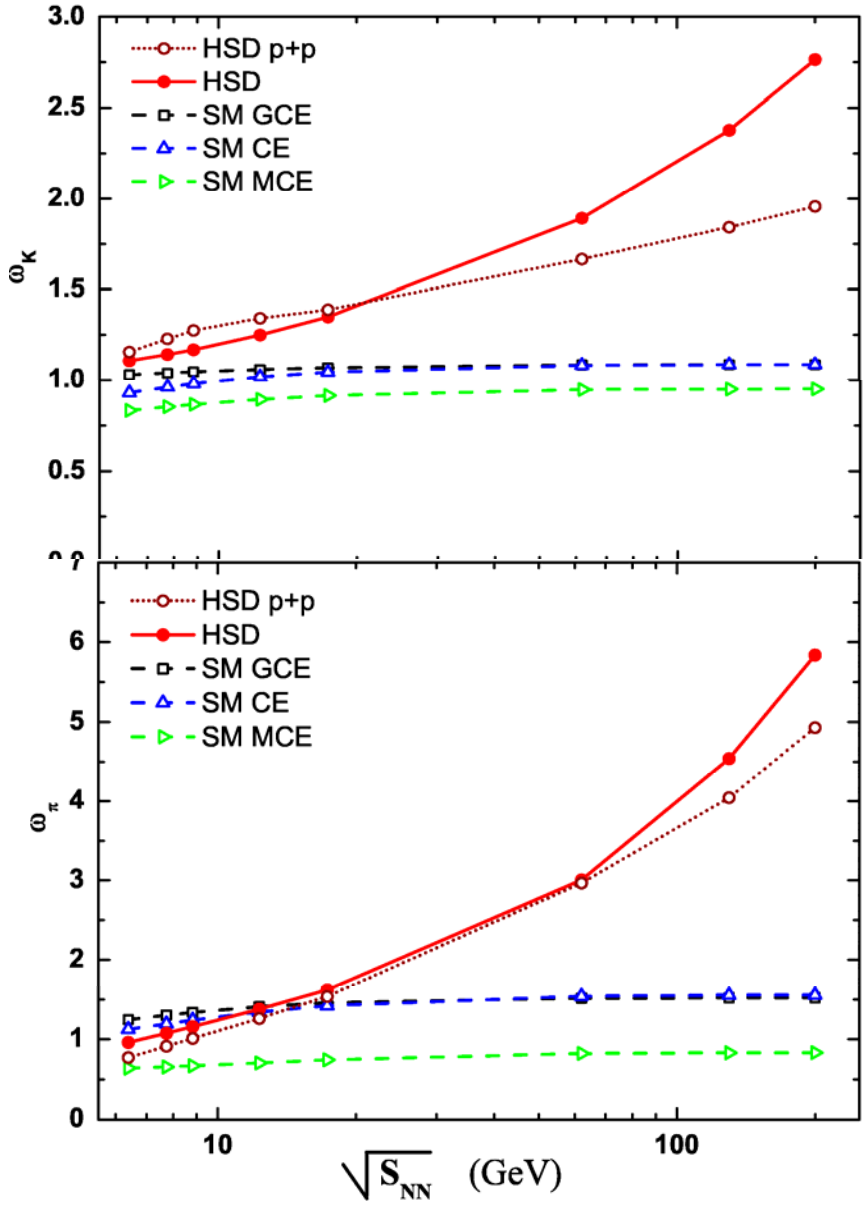
Begun, Gazdzicki, M.I.G. Hauer, Konchakovski, Lungwitz, Phys. Rev. C (2007)

Comparison with the NA49 data



$$q = 0.038,\ 0.063,\ 0.085,\ 0.131,\ 0.163$$

Begun, Gazdzicki, M.I.G. Hauer, Konchakovski, Lungwitz, Phys. Rev. C (2007)


HSD p+p
HSD
SM GCE
SM CE
SM MCE
ω_K
HSD p+p
HSD
SM GCE
SM CE
SM MCE
ω_π
10
100
$\sqrt{S_{NN}}$ (GeV)