Succeptiblity Scaling Functions – Dynamics driven

The CEP's location and critical exponents are used to obtain the non-singular scaling functions

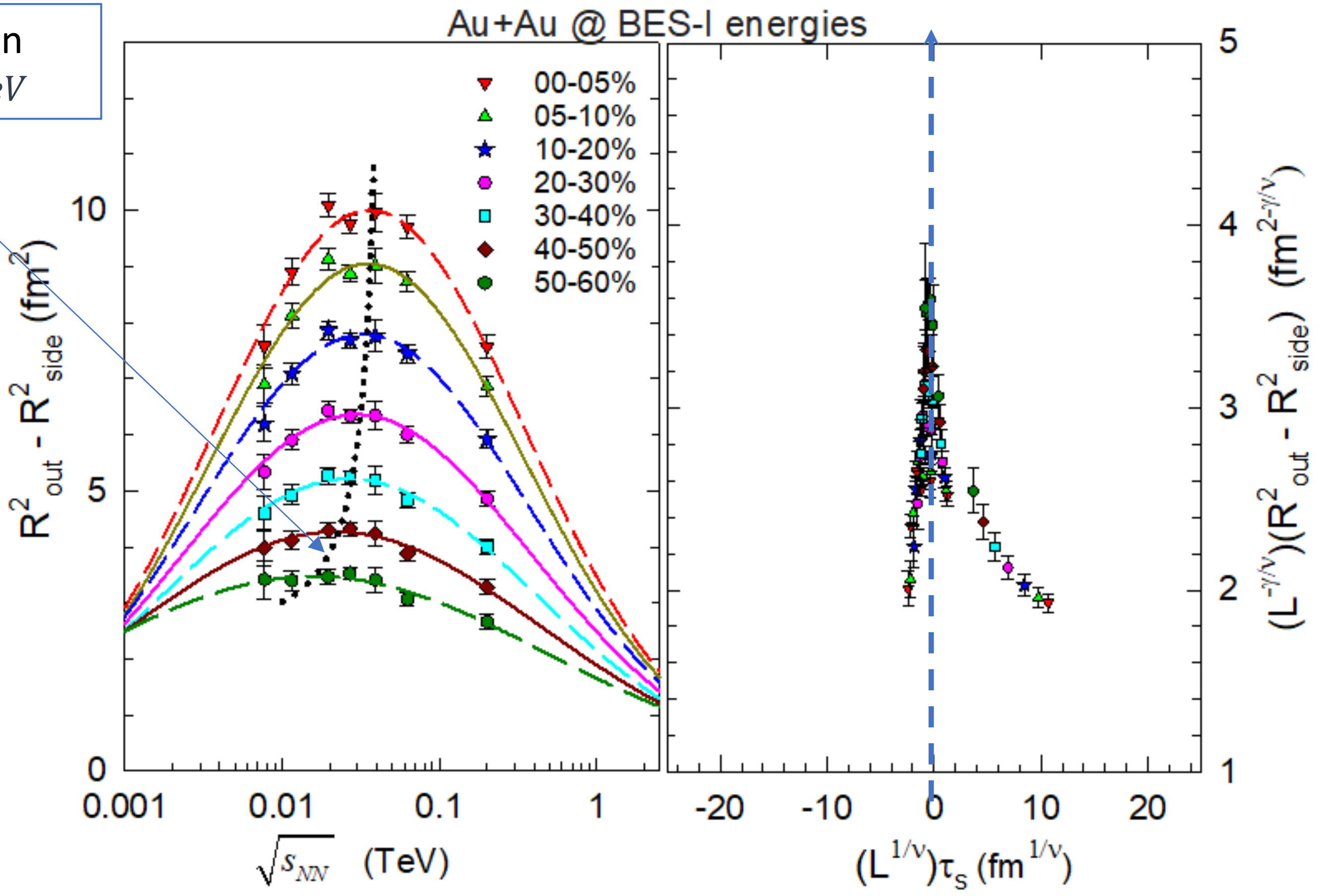
$$L^{-\gamma/\nu}\chi(\tau_s, L) = f_2^s(\tau_s L^{1/\nu})$$

$$\tau_s = (\sqrt{s} - \sqrt{s_{CEP}})/\sqrt{s_{CEP}}$$

$\nu \sim 0.63$ $\gamma \sim 1.237$

$\sqrt{s_{NN}}(\infty) \sim 45.0$ GeV

Critical scaling region
✓ $18 < \sqrt{s} < 37\ GeV$



Data collapse onto a single curve, confirms the expected non-singular scaling function.

Succeptiblity Scaling Functions – Fluctations driven

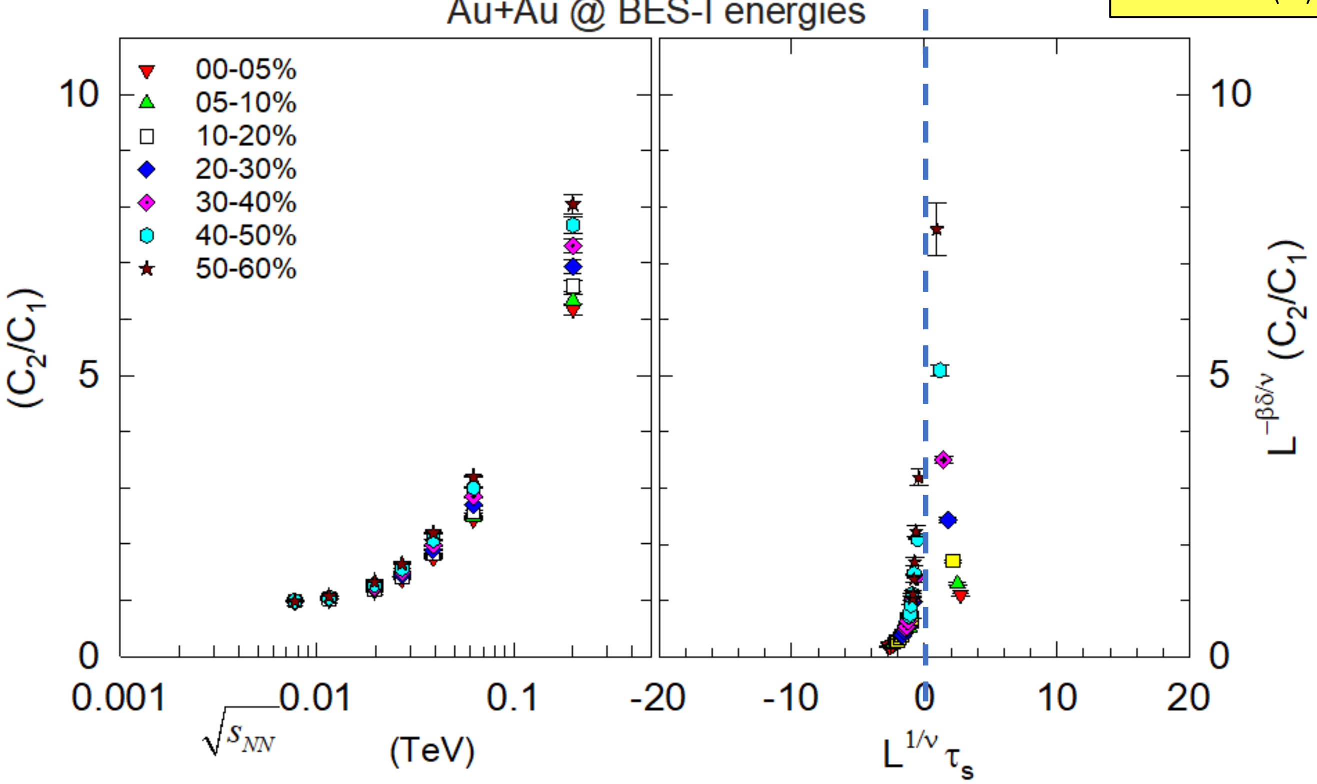
$\sqrt{s_{NN}} \longrightarrow (\mu_B)$

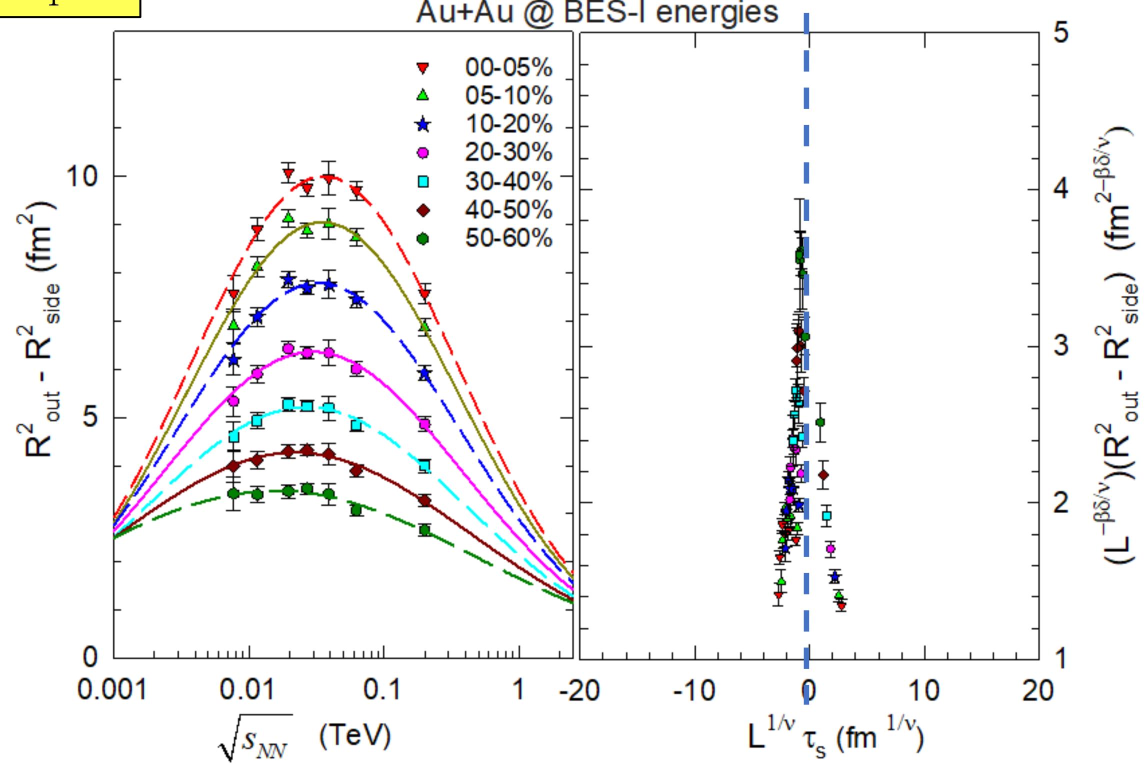
$$L^{-\beta\delta/\nu}\chi(\tau_s, \mathrm{L}) = f_1^{\mu}(\tau_s L^{1/\nu})$$

$$\frac{1}{\langle N\rangle}\left(\frac{\partial\langle N\rangle}{\partial\beta\mu}\right) = \frac{\langle N^2\rangle - \langle N\rangle^2}{\langle N\rangle}$$

$$\kappa_T \propto \frac{\langle N^2\rangle - \langle N\rangle^2}{\langle N\rangle} = \frac{C_2}{C_1}$$

$$L^{-\beta\delta/\nu}\chi(\tau_s, \mathrm{L}) = f_1^{\mu}(\tau_s L^{1/\nu})$$





Data collapse onto a single curve, confirms the expected non-singular scaling functions

Dynamic Finite – Size Scaling

➢ 2nd order phase transition

$\nu \sim 0.63$ $\gamma \sim 1.2$

$\sqrt{s_{NN}}(\infty) \sim 45.0$ GeV

DFSS ansatz

at time t when $\sqrt{s}$ is near $\sqrt{s_{cep}}$

$$\chi(L,\sqrt{s},t) = L^{\gamma/\nu} f\left(\tau_s\ L^{1/\nu}, tL^{-z}\right)$$

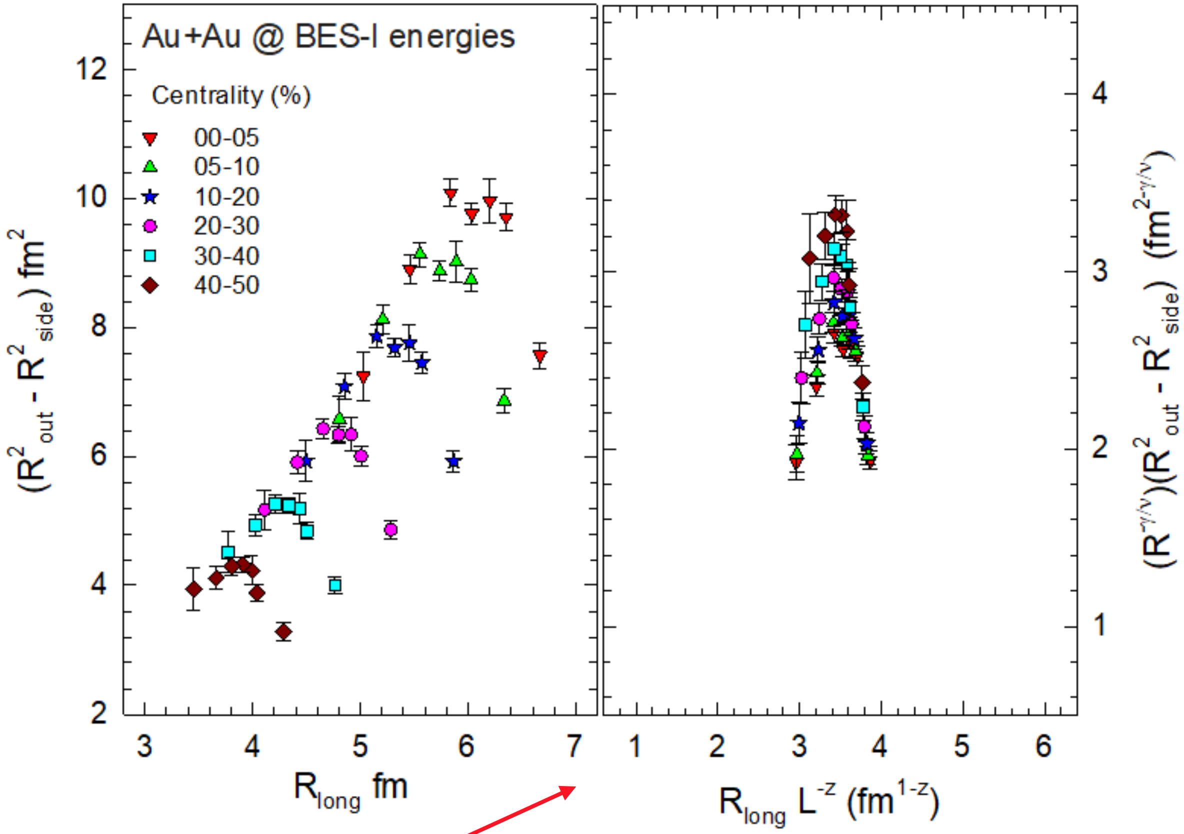
For $\sqrt{s} = \sqrt{s_{cep}}$

$$\chi\left(L,\sqrt{s_{cep}},t\right) = L^{\gamma/\nu} f(tL^{-z})$$

M. Suzuki,
Prog. Theor. Phys. 58, 1142, 1977

$R_{long} \propto \tau$

$z \sim 0.785$



Experimental estimate of the dynamic critical exponents