

# Investigation of the symmetry energy in EOS by isoscaling in heavy ion reactions

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Isospin is an important degree in nuclear physics, recent years the availability of high intensity radioactive beams facilitates the exploration of the isospin degree of freedom in nuclear reactions. Constraint the symmetry energy term in Equation of State (EOS) of isospin asymmetry nuclear matter and finite nuclei is the most hot topics via nuclear reaction. Isoscaling was found to be one effective probe to constrain the symmetry energy coefficient in EOS, including its temperature, density and momentum dependence.

Isoscaling parameters deduced from experiment can directly constrain the symmetry energy coefficient  $C_{\text{sym}}$  in EOS [1], but the statistical secondary sequential decay affect the reaction products distributions, as well as the isoscaling parameters. We attempted to study the dependence of isoscaling parameters on the symmetry energy coefficient  $C_{\text{sym}}$ , and check the statistical secondary sequential decay effect on isoscaling parameters and the extraction of  $C_{\text{sym}}$  from isoscaling [2]. Projectile fragmentation has also been measured to investigate the isoscaling rule.

We also studied the Giant Dipole Resonance (GDR) via isospin dependent quantum molecular dynamics model simulation, investigated the GDR parameters dependence on isospin degree and incident channels .

[1] M. B. Tsang et al, Phys. Rev. C 64 (2001) 054615

[2] W. D. Tian et al, Phys. Rev. C 76 (2007) 024607