The symmetry energy in the heavy ion collision at intermediate energies

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One of the most recent topics in the investigation of the nuclear equation of state for nuclear matter is to determine the density dependence of the symmetry energy.The symmetry energy is a fundamental ingredient in the investigation of exotic nuclei, heavy-ion collisions and astrophysical phenomena. One of the possible ways to extract this value is based on the analysis of experimental data from heavy-ion collision at intermediate energies. We present an experimental analysis of nuclear gases produced in the violent collisions of ^{64}Zn+^{92}Mo, ^{197}Au for 35 MeV/A projectile energy. Based on an isoscaling analyses of the yields of nuclei with A$\leq$4 the temperature and density dependent symmetry energies has been extracted. The comparison with theoretical calculations of the symmetry energy shows that the experimentally obtained values are larger than those calculated by models based on mean field approaches. Calculations using a quantum statistical approach are in a good agreement with the experimental data.