Reaction Mechanism and Hot Nucleonic Matter

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The reaction mechanism and the nature of hot nucleonic matter produced in the ^{64}Zn + ^{58}Ni reaction at 35A to 79A MeV have been successfully studied in our previous work[l], using the antisymmetrized molecular dynamics model (AMD-V) of Ono et al. [2]. This study has now been extended to heavier systems and lower incident energies. The measurements of the ^{64}Zn + ^{64}Zn, ^{92}Mo and ^{197}Au reactions have been completed, using the TAMU NIMROD detector array at the incident energies between 15A MeV to 47A MeV.

In order to identify the heavy evaporation residues at the lower incident energies, a time of flight measurement was added between RF and the IC's of Ring 2-3 (4^o <2 <8^o) and Ring 4-5 (8^o <2 <15^o). A pressure of 30 Torr Of C_3F_8 gas was used for the ionization chamber. A complete data analysis is now underway.

AMD-V calculations are also now underway for these systems using the Riken VPP700 Super computer facility. The probability of residue formation and the residue mass distributions will provide an additional sensitive probe for the nuclear semi-transparency, discussed in reference [1]. A systematic study of a wide variety of reaction systems at different incident energies will provide a better understanding of the reaction mechanisms and the nature of the hot nucleonic matter produced in intermediate energy heavy ion reactions.

References

[1] R. Wada *et al*., Phys. Rev. C **62** (2000) 034601.

[2] A. Ono, Phys. Rev. C **59** (1999) 853.