An extra push from entrance-channel effects

Nabila Grar and Neil Rowley
Experimental obstacles for heavy systems reactions investigation

\[ \sigma_{\text{cap}} = \sigma_{\text{fus}} = \sigma_{\text{ER}} + \sigma_{\text{FF}} \]

\[ \sigma_{\text{cap}} = \sigma_{\text{ER}} + \sigma_{\text{FF}} + \sigma_{\text{QF}} \]
Main features for heavy systems fusion probability

- An important shift of the dynamical barrier
- An important variance
- The fusion is still enhanced below the uncoupled barrier
The macroscopic models reproduce the extra push for several systems. They fail to reproduce the enhancement below the uncoupled barrier.
The multiphonon excitation is necessary to reproduce the data.

The coupled channel calculation is relevant for the description of this system.
The effect of the coulomb excitation is to shift the dynamical barrier.

In this calculation, the uncoupled barrier is 6 MeV higher than the Bass barrier.
Fusion probability on linear and logarithmic scale for the indicated systems

- 100Mo+98Mo
- 100Mo+96Mo
- 100Mo+92Mo

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The excellent quality of the agreement in reproducing the isotopic trend

The shift of the uncoupled barrier is consistent between the different systems
100Mo+92Zr [4,2].

100Mo+96Zr [4,2].
- The results are similar to Ca40+Zr96
- The Q-value for neutron transfer is unfavourable for Mo100+Zr96
- The elastic transfer of alpha particules should play similar role in case of Mo100+Zr96
More phonons are needed to reach the convergence of the calculation

We have different experimental data according to the different values of the shell correction used in the statistical code
The role of the entrance channel effect in reproducing the Dinfini.

The global fit in CC calculations of Dinfini for the heavy systems investigated in this study.

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No extra push energy is expected in this case.

This should be the case for almost well deformed nuclei.

Coulomb excitation favouring automatically the more compact touching point.
The coupled channel calculation is still relevant for the description of heavy systems capture cross section.

The validity of the Bass parametrisation for the uncoupled barrier.

The extraction of the experimental data using statistical codes.

The quasi fission reaction modelisation.
Collaboration

- Kouichi Hagino, Department of Physics, Tohoku University, Sendai, Japan
- Monica Trotta, INFN, Italie