

The importance of nuclear structure in heavy-ion fusion at sub-barrier energies

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We recently measured the fusion cross sections of the $^{40}\text{Ca}+^{58}\text{Ni}$ and $^{40}\text{Ca}+^{64}\text{Ni}$ reactions at energies around and below the Coulomb barrier. This experiment was performed at Laboratori Nazionali di Legnaro (LNL, Italy), using high-quality and intense $^{40}\text{Ca}^{9+,10+}$ beams from the XTU Tandem accelerator and the LNL electrostatic deflector in its upgraded setup mode. The fusion excitation functions and barrier distributions were extracted from the data and compared to coupled-channels calculations. The main goal of our study was to investigate the influence of the nuclear structure of the colliding nuclei on their fusion cross sections.

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