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## Fusion Reactions with Exotic Nuclei

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### Abstract

The cross section for the fusion of  ${}^9\text{Li}$  with  ${}^{70}\text{Zn}$  was measured for seven projectile energies spanning the sub-barrier and near barrier region ( $E_{c.m.}$  ranging from 9.7 to 13.4 MeV) using the ISAC facility at TRIUMF. Gamma ray spectroscopy of the irradiated target foils along with beta counting of the chemically separated Ge and As evaporation residues were used to measure the fusion cross sections. Statistical model calculations were used to correct for the yields of any unobserved nuclei. The observed fusion excitation function shows significant sub-barrier fusion enhancement with a large deduced value of the fusion radius,  $R_B=12.1\pm 1.0$  fm. Coupled channels calculations do not account for the observed sub-barrier enhancement. We measured subsequently the fusion excitation function for the reaction of  ${}^9\text{Li}$  with  ${}^{208}\text{Pb}$  using the  ${}^9\text{Li}$  beam from ISAC2. The evaporation residues were short-lived alpha emitters and were stopped in the target-catcher foil assembly and detected by their decay. Measurements were taken in the “beam off” period ( $\sim 85$  ns) between beam bursts of the pulsed ISAC2 beam.