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Reaction Mechanism Dependence Of The Population And Decay Of ^{10}HE[1] HAN LIU, THOMAS REDPATH, MICHAEL THOENNESSEN, NSCL/MSU, MONA COLLABORATION — Measurements of neutron unbound systems allow for stringent tests of theoretical nuclear structure models at extreme neutron-to-proton ratios. It was recently suggested that the decay of broad neutron unbound states would be sensitive to the incoming channel wavefunction. Thus, the extended wavefunctions of halo nuclei could significantly affect the observed decay energy spectra for broad neutron unbound resonances. Experimental evidence for such an effect had been suggested in the case of ^{10}He. Its ground state resonance decaying to ^{8}He+n+n exhibited a shift of about 500 keV when populated in a proton removal reaction from ^{11}Li compared to the transfer reaction ^{8}He(t,p). In order to test this effect we measured the ^{10}He ground state resonance in two reactions using beams with different wavefunctions. We compared the decay energy spectrum of ^{10}He populated in a three-proton removal reaction from the (non-halo) nucleus ^{13}B with the spectrum from the one-proton removal reaction using the halo-nucleus ^{11}Li. The decay energy spectra were reconstructed from the measured momenta of the ^{8}He fragment and two coincident neutrons. The experiments were performed at the Coupled Cyclotron Facility of the NSCL with the Sweeper magnet and the MoNA-LISA array.

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