

# **Experimental study of the $^{17}\text{F}+^{12}\text{C}$ fusion reaction using the 'Encore' active target detector and its implications for fusion of proton-halo systems.**

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Implications of the halo nature of the low-lying  $1/2^+$  first excited state of the exotic weakly-bound proton drip-line nucleus  $^{17}\text{F}$  has long been hypothesized. The structure of such a halo nucleus would imply special nuclear properties including, possibly, an enhancement in its fusion cross section above the barrier. The total fusion cross section of the  $^{17}\text{F}+^{12}\text{C}$  near the Coulomb barrier was studied using the newly developed 'Encore' active-target detector at Florida State University. Encore is a Multi-Sampling Ionization Chamber (MUSIC) which measures energy losses as the beam travels through the detector. Results on the  $^{17}\text{F}+^{12}\text{C}$  fusion experiment and its implications for fusion of proton halo systems will be presented. The flexibility of this type of detector to measure fusion,  $(\alpha,p)$  and  $(\alpha,n)$  as well as fusion-fission reactions relevant for nuclear structure and nuclear astrophysics, will also be discussed.

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