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Study of 22Ne and 28Mg excited states using fusion-evaporation and Doppler shift measurements JONATHAN WILLIAMS, Simon Fraser University, TIGRESS COLLABORATION[1] — Electromagnetic transition rate measurements serve as a fundamental probe of nuclear structure and provide a stringent test for theoretical models. Doppler shift lifetime measurements offer an opportunity to directly access information about electromagnetic transition rates and discriminate between model calculations. The TIGRESS Integrated Plunger device (TIP), constructed at SFU, supports Doppler shift lifetime measurements via gamma-ray spectroscopy with the TIGRESS segmented Ge array as part of the experimental program at the ISAC-II facility of TRIUMF. A recent study commissioning the TIP device employed the fusion-evaporation reaction of ^{18}O + ^{12}C at a beam energy of 48 MeV, with reaction channel selection provided via coincident charged particle detection using ancillary CsI(Tl) detectors. Transitions were identified belonging to the 2 alpha particle and 2 proton evaporation channels from the compound system ^{30}Si, corresponding to ^{22}Ne and ^{28}Mg respectively. Lineshapes, from which lifetimes can be determined by comparison to simulated data, have been observed for these transitions. The experimental approach, analysis procedure, and a comparison of lineshapes to simulations obtained using the GEANT4 toolkit will be discussed.

[1]Experimental group using the TIGRESS spectrometer at ISAC-II in TRIUMF.

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