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## Electromagnetic Transition Rate Studies in $^{28}\text{Mg}$

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Neutron rich Mg isotopes far from stability belong to the island of inversion, a region where the single particle energy state description of the shell model breaks down and the predicted configuration of the nuclear states becomes inverted. Nuclei in this region also exhibit collective behaviour in which multiple particle interactions play a significant role in nuclear wavefunctions and transitions. This can be observed through electromagnetic transition strength measurements.

In-beam reaction experiments performed at TRIUMF, Canada's particle accelerator centre, allow for precision measurements of nuclei far from stability. Using TIGRESS in conjunction with the TIGRESS Integrated Plunger for charged particle detection, electromagnetic transition rates can be measured to probe nuclear wavefunctions and perform tests of theoretical models using the well-understood electromagnetic interactions.

In this talk, I will discuss an experiment performed using TIGRESS and the TIGRESS Integrated Plunger to measure the lifetime of the first excited state in  $^{28}\text{Mg}$ . This experiment utilized both the Doppler Shift Attenuation Method and the Recoil Distance Method, which exploit the Doppler shift of gamma rays emitted in flight, in order to be sensitive to both short- and long-lived states in the nucleus. The current state of data analysis and the impacts on nuclear physics will be discussed.

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### Please select: Experiment or Theory

Experiment

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