Decay of ^{34}Mg and Its Daughters

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^{34}Mg sits near the island of inversion near the magic number N=20. Its decay includes both beta-delayed one and two neutron emissions and a long decay chain of mass 34, 33, and 32. To understand its decay feeding, there are several hurdles that must be overcome. Along its decay chain, ^{34}Si is known to have a low-lying state that decays via an E0 transition, which hinders the beta-particle tagging and must be accounted for when counting the beta-electrons. Also, the beta-delayed neutron branching ratios from Mg and Al are not well known.

An experiment was conducted at TRIUMF Laboratory using the GRIFFIN spectrometer, which included the use of HPGe detectors, plastic scintillator detectors, and new OGS neutron detectors to observe the decay of ^{34}Mg, its decay chain, and beta-delayed daughters. From this data, the goal is to extract branching ratios for beta-delayed neutron one and two emissions along with detecting any new energy transitions in the decay chain of ^{34}Mg. Utilizing the Bateman Equations to fit the decay chain, we can narrow down the ranges for the beta-delayed branching ratios and confirm predetermined half-lives. From this fit, we also need the beam intensity which would then give an absolute decay rate to help determine the decay feeding intensity.