

Test for traditional vibrational wisdom in $^{110/112}\text{Cd}$ through spectroscopy with $(^3\text{He},n)$ two proton stripping reactions

The cadmium nuclei have traditionally been regarded as best examples of spherical vibrational nuclei. However, advances in nuclear spectroscopy have begun to detail the properties of these nuclei at the two and three vibrational phonon levels, casting doubts on the vibrational assumptions. In particular the properties of the excited 0_n^+ (i.e. for $n \geq 2$) levels are key to vibrational models.

In this experiment, details of the population of the excited 0_n^+ levels are investigated at high resolution using $^{108,110}\text{Pd}(^3\text{He},n\gamma)^{110,112}\text{Cd}$ two proton stripping direct reactions at 25 MeV. The experimental technique involves operating AFRODITE in coincidence with a wall containing 12 large plastic scintillators to detect the fast neutrons from the direct reaction.