FAST TIMING CAPABILITY FOR THE CAESAR ARRAY

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Six $LaBr_3$ detectors have been incorporated into the CAESAR HPGe detector array to add gamma-gamma fast timing capabilities. This will allow probing of transition strengths in a new lifetime regime at the Heavy Ion Accelerator Facility, Australian National University (ANU). These modern detectors have excellent timing resolution (~250 ps) and very good energy resolution (~3.0%) compared to other scintillator materials. However, at this time scale, gamma energy dependent delays in time measurements become significant. A calibration protocol using a ^{60}Co source and a model derived for constant fraction discrimination timing techniques were tested.

One anticipated application of the new system is the investigation of collective behaviour in shape coexisting nuclei; a key region for future study is the neutron-deficient Pt/Hg/Pb region. As an initial test case, using four of the six $LaBr_3$ detectors coupled to CAESAR, ^{188}Pt was studied. Excited states were populated using the ^{176}Yb(^{16}O, 4n)^{188}Pt reaction. Gates set on the HPGe detectors were used to isolate decay sequences and hence to extract lifetimes of sub-nanosecond 7^- and 12^+ states using the $LaBr_3$ detectors. The level scheme for ^{188}Pt has also been revised from gamma-gamma coincidences with the HPGe detectors.

The new results for ^{188}Pt will be presented and future opportunities that are made possible by fast timing capability will be discussed.