Confirmation of the molecular structure of excited bands in ^{21}Ne

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Physics objectives– The main objectives of this experiment are to accurately measure γ-ray branching ratios for the excited $K^\pi = 3/2^-$, $1/2^+$ and $1/2^-$ cluster bands. The level lifetimes are known, hence, these data will lead to transition-rate probabilities. In addition, the measurement aims to resolve the missing $K = 1/2$, $I^\pi = 5/2^-$ state via optimisation of the Doppler correction. The structures known in ^{21}Ne suggest that the $I^\pi = 5/2^-$ state is juxtaposed with the $K = 1/2$, $I^\pi = 5/2^+$ level.

Experimental details– The fusion-evaporation reaction, $^{16}_{8}\mathrm{O}(^{7}_{3}\mathrm{Li}, n\,p)^{21}_{10}\mathrm{Ne}$ was used at a ^{7}Li bombarding energy of 31 MeV on stacked targets of Li_2O totalling 600 μg/cm^2. There were no significant problems during experiment either with TRACE or AGATA. The detector rates were such that two triggers were used: TRACE in coincidence with two AGATA crystals and four AGATA-crystal coincidences.

Status– The ^{56}Co source for the high-energy efficiency calibration was produced at Legnaro at the end of July 2011, and in August was successfully used for the AGATA calibration. The data from this experiment in March 2011 (10 TB) has been copied to the University of Birmingham and the crystal segments gain-matched on a run-by-run basis. Implementation of the TRACE geometry into the sort code is now underway. A near-line analysis of the data during the experiment demonstrated that the particle discrimination and the γ-ray coincidences were working.

Publications and conference talks– To date, this experiment has been presented at EGAN2011, Padova, Italy, by C. Wheldon. Results and publications *etc.* are expected in 2012.