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Characterising a Super Heavy element RECoil detector (SHREC)

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A new focal plane detector system for the Berkeley Gas-filled Separator (BGS) was designed, constructed, and tested offline with various α-decay and conversion-electron sources. The detector for SuperHeavy RECoils (SHREC) aims to identify separated recoiling heavy and superheavy nuclei using their implantation signal as well as their correlated radioactive decay paths. Following a characterisation of SHREC with radioactive sources in Lund and Berkeley, the in-beam commissioning was done with the fusion-evaporation reaction 208Pb(48Ca,xn)256-xNo, x=1,2, at two beam energies. The read-out electronics converted the preamplifier signals of SHREC's 540 detector channels into typically 30-μs long digitised traces. My master thesis aims to optimise SHREC energy resolution with a trace analysis code using the known decay chain of 254No and to verify the present Geant4 version of SHREC. As a second step partially known and possibly new short-lived isomeric states in 254No and 255No will be investigated by searching for electron signals tagging isomeric decay between the implantation and α-decay signals of 254,255No, respectively.

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