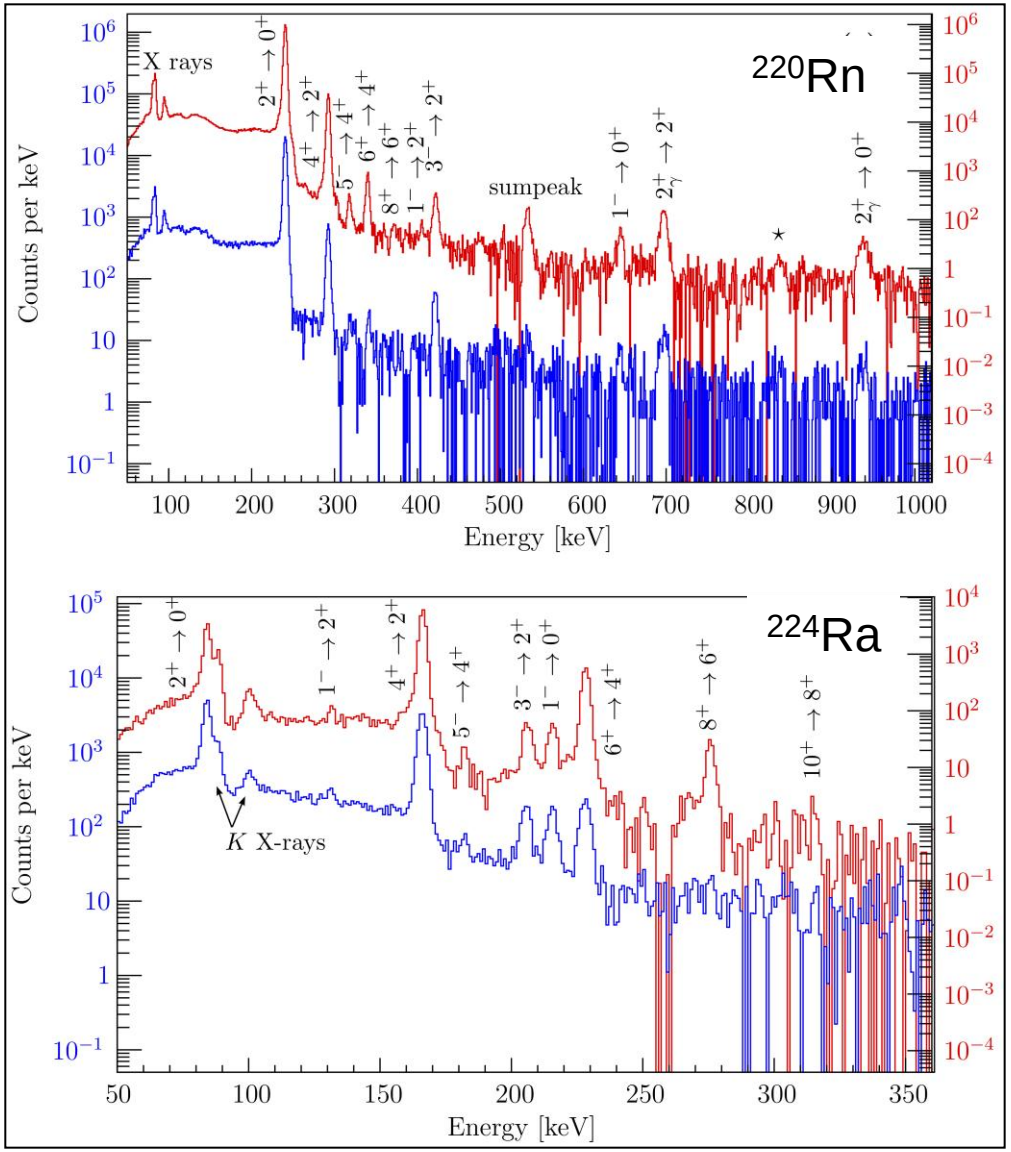
P-347
Measurements of octupole collectivity in Rn and Ra nuclei using Coulomb excitation

Peter Butler, David Joss and Marcus Scheck on behalf of

ISOLDE-Darmstadt-GANIL-*Groningen**-*Guelph**-Jyvaskyla-Koln-Livermore-Leuven-Liverpool-Lund-*Michigan**-C Michigan-Oslo-Rochester-Saclay-SAS-Warsaw-W Scotland-York collaboration

**EDM programmes at ANL and TRIUMF*

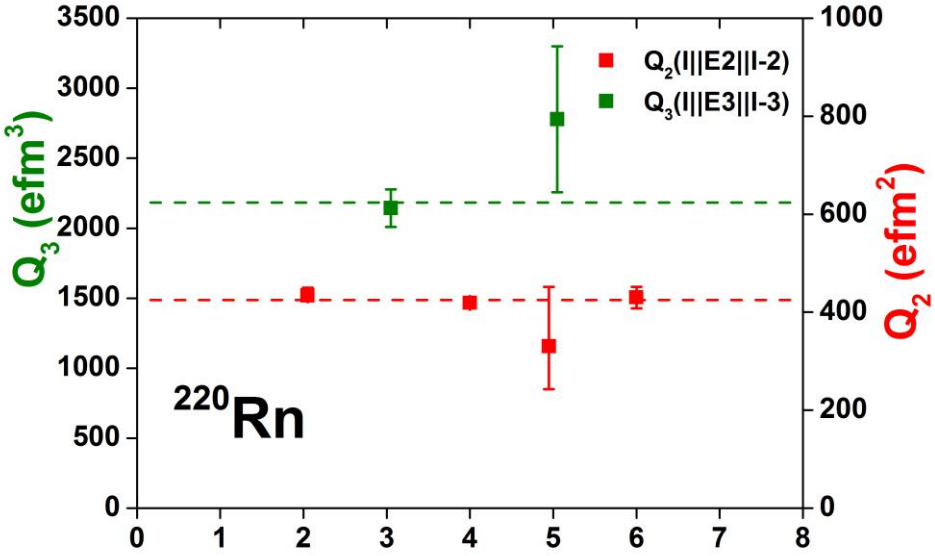
IS475: Coulex of ^{220}Rn, ^{224}Ra

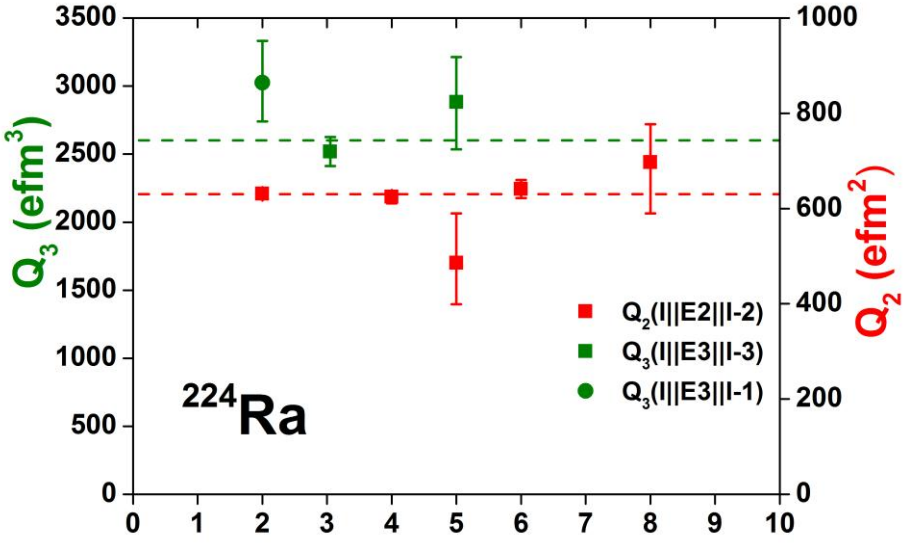


^{120}Sn target

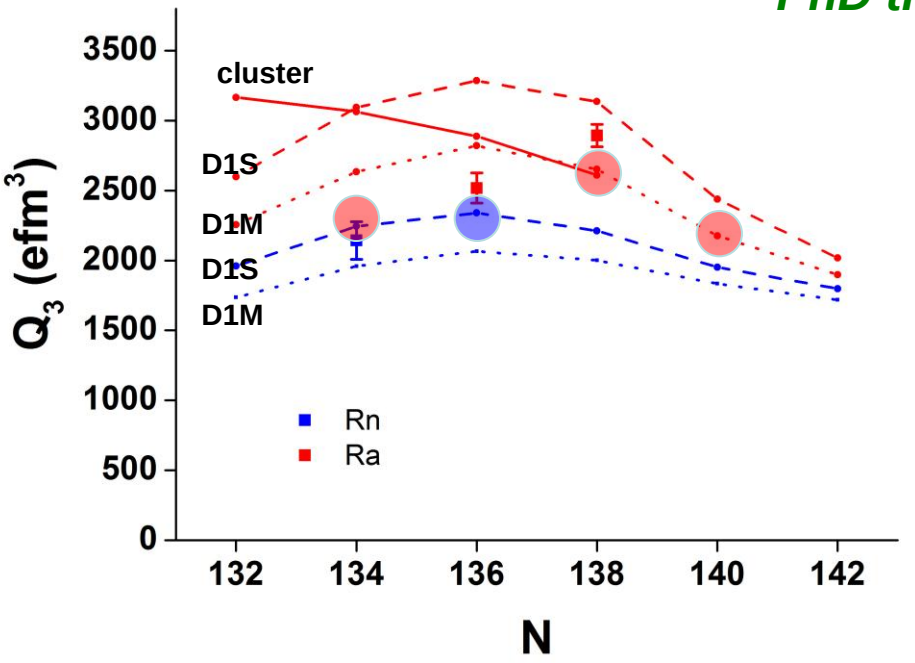
^{60}Ni target

Results from IS475: proposed new measurements of B(E3)





PhD thesis of Liam Gaffney



proposed

^{222}Rn

^{222,226,228}Ra

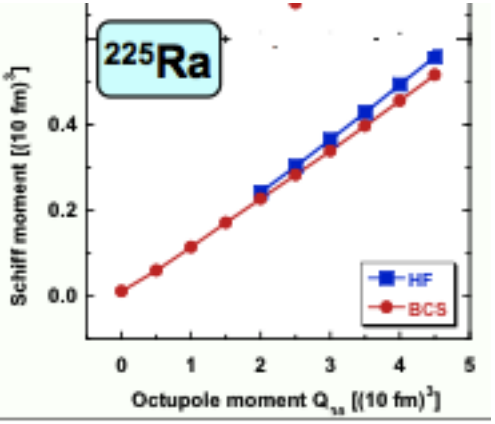
email received this morning from L Robledo: reduces discrepancy

Schiff moment

$|d(^{199}Hg)| < 3.1 \times 10^{-29}$ e cm *(Griffith et al PRL 102 (2009) 101601)*
In many cases provides best limits on CP-violating phases (SUSY)

$$S = < \Psi_0 | \hat{S}_z | \Psi_0 >$$

where



$$\hat{S}_z = \frac{e}{10} \sum_p (r_p^2 - \frac{5}{3} \overline{r_{\rm ch}^2}) z_p$$

mean square charge radius

Sum over protons

directly related to Q_3

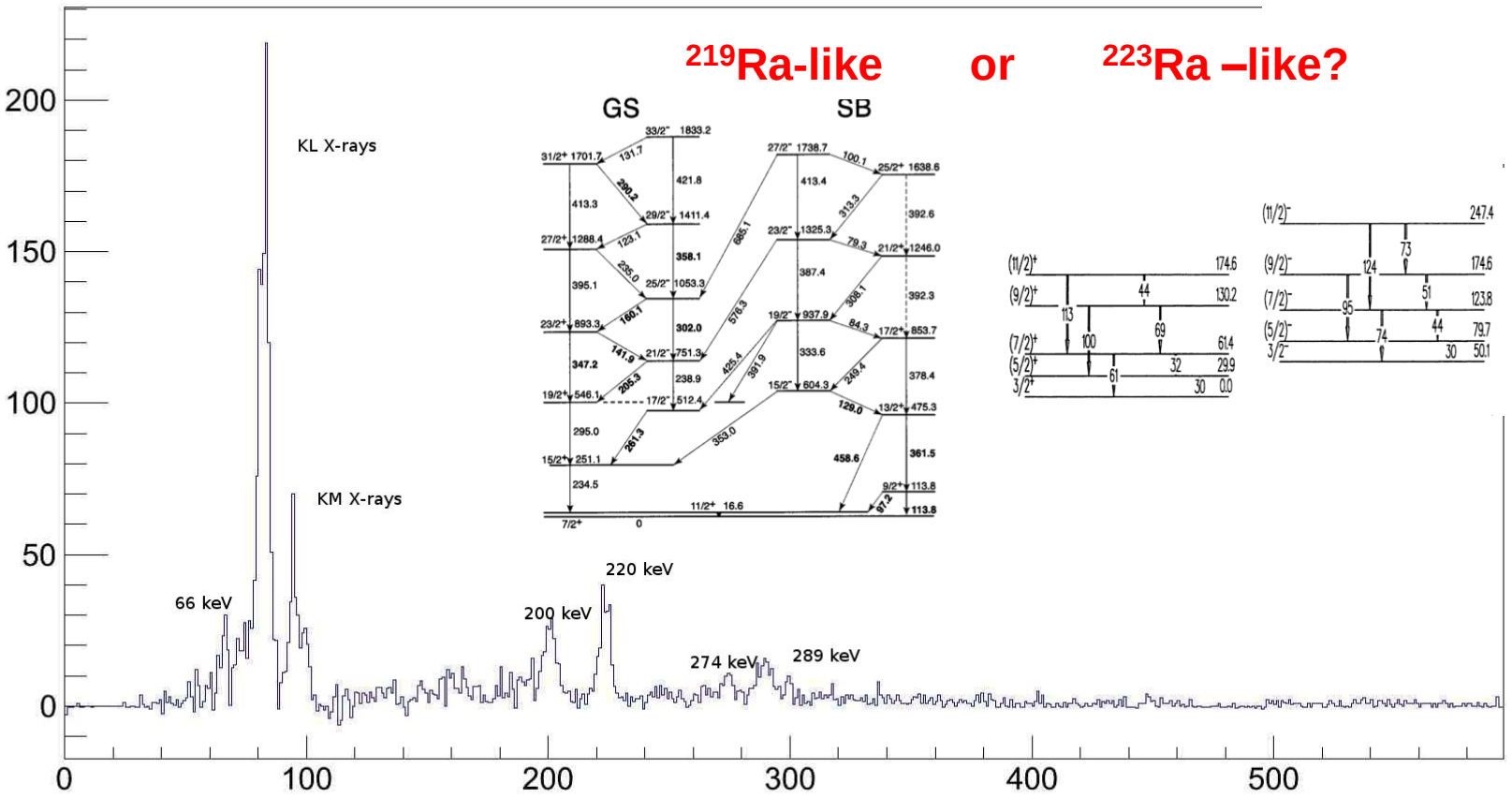
T-violating n-n interaction

$$S = -2 \frac{J}{J+1} \frac{< \hat{S}_z >< \hat{V}_{PT} >}{\Delta E}$$

sensitivity improved by 100-1000

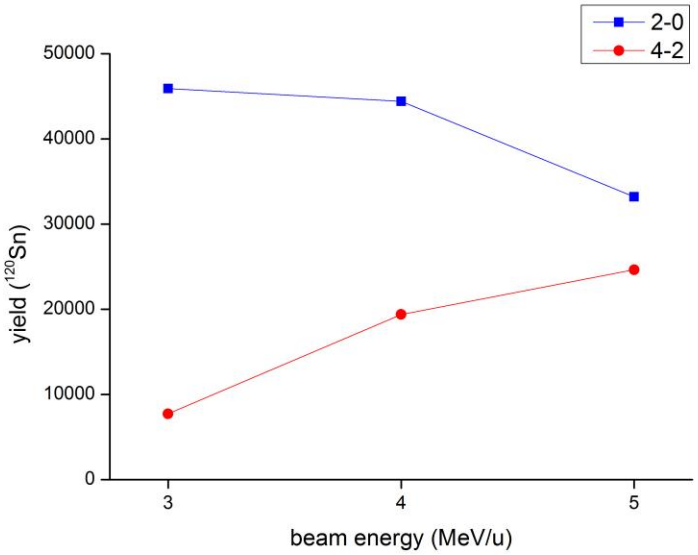
energy splitting of parity doublet

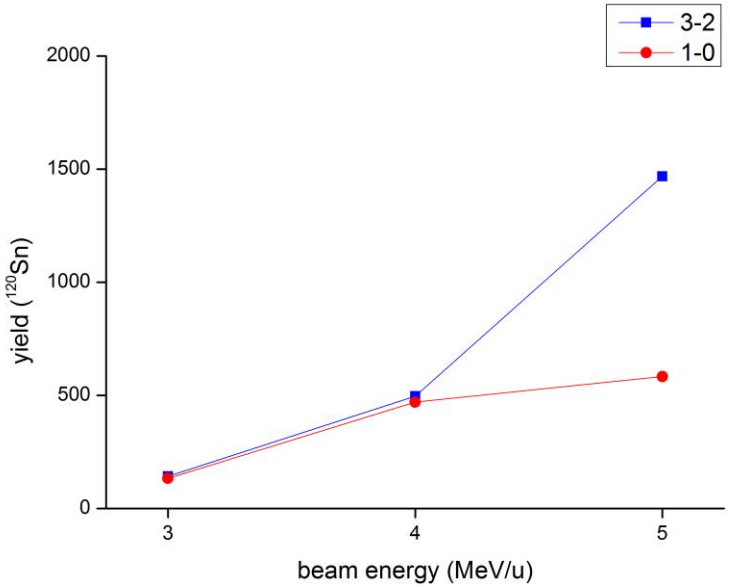
IS475: ^{221}Rn gamma-ray spectrum

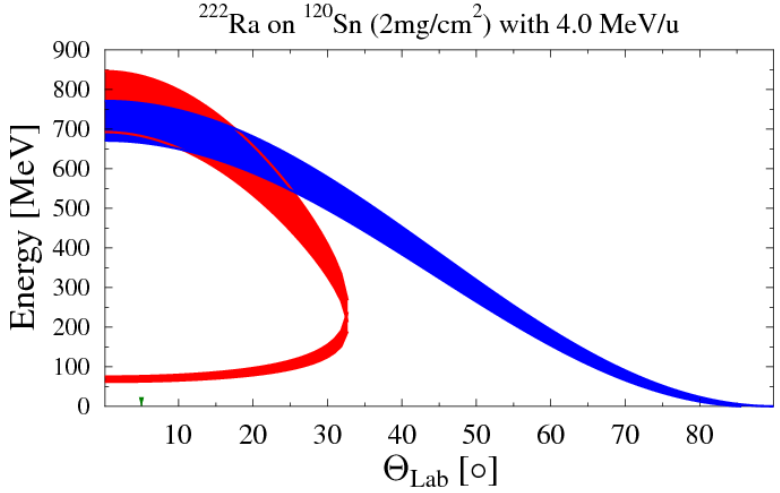


We propose to measure both γ-rays and internal conversion electrons;
Measure ΔE of parity doublet

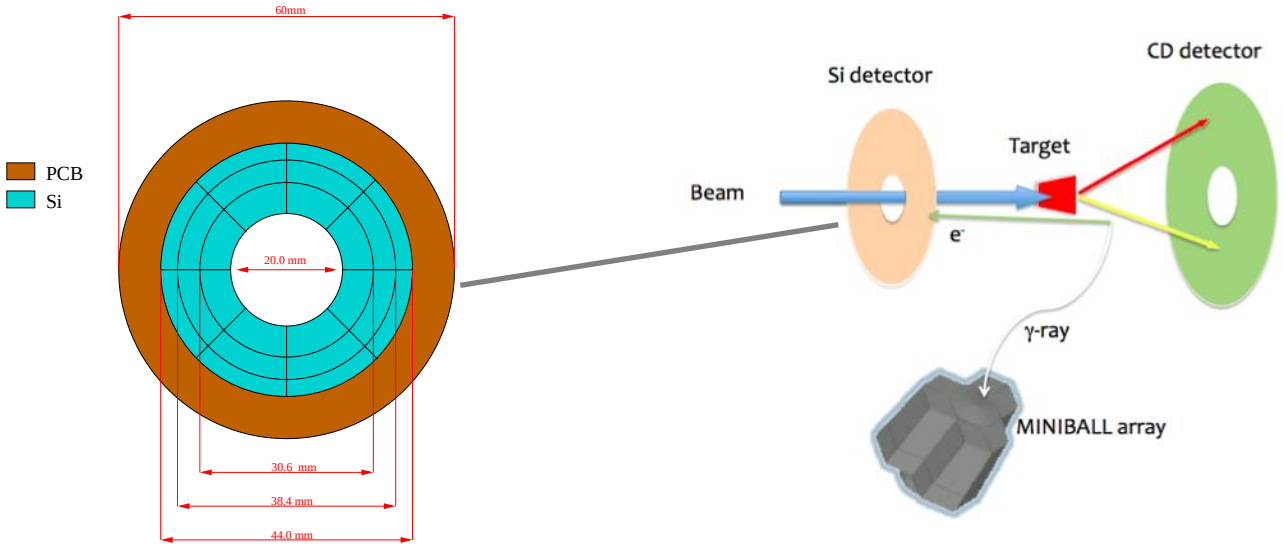
Importance of higher beam energies







SPEDE: conversion electron spectrometer



Resources:

Liverpool about to order the detector from Micron(£20,000 grant)
Mechanical design and manufacturing to be made at JYFL.
Liverpool will take care of the front-end PCB design and manufacture.

Timeline:

SPEDE should be commissioned at JYFL. We aim to have detector and PCB ready for testing in the autumn 2013.

Manpower: Janne Pakarinen (Finnish Academy Fellow) +postdoc at Jyvaskyla PAB and George O'Neill (STFC project student) at Liverpool

Beam time request

3 shifts set-up

6 shifts ^{221}Rn 5 MeV.A **structure**

9 shifts ^{222}Rn 4 MeV.A

3 shifts set-up

3 shifts ^{222}Ra 4 MeV.A

2 shifts ^{226}Ra 4 MeV.A

3 shifts ^{228}Ra 4 MeV.A **B(E3)s**

29 shifts in total