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Absolute transmission and separation properties of the gas-filled recoil separator RITU

J. Sarén*, J. Uusitalo, M. Leino, J. Sorri

Department of Physics, University of Jyväskylä, P.O. Box 35, FI-40014, Jyväskylä, Finland

TASCA 11

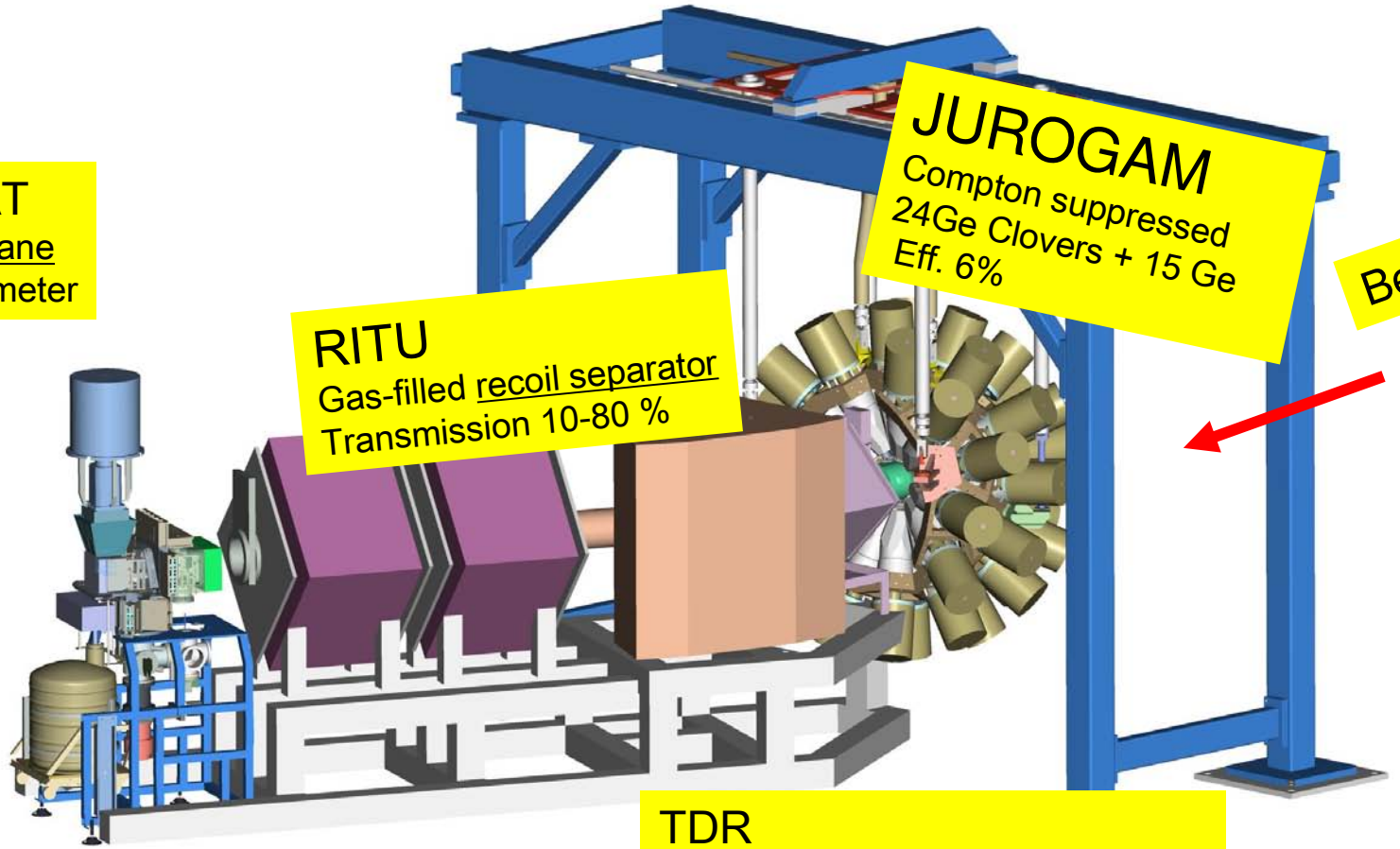
GSI, Darmstadt, October 14, 2011

10th Workshop on

Recoil Separator for Superheavy Element Chemistry

REC SEP @ SHE CHEM

RDT Instrumentation at JYFL in Jyväskylä, Finland



Transmission studies
by comparing the gamma yield to the recoil gated gamma yield

J. Uusitalo, thesis -1996

Single Ge detector

$^{159}Tb(^{22}Ne, 4n)^{177}Re$

Target 420 µg/cm2

Transmission 6 %

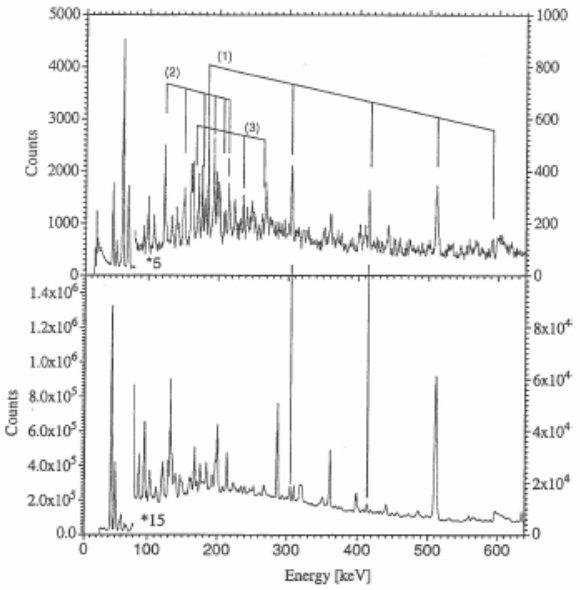


Fig. 5.4. *The singles-gamma-ray spectrum and the recoil-gamma-ray coincidence spectrum collected in the run $^{22}Ne + ^{159}Tb$ with a laboratory energy of 102 MeV. Band sequences identified from the upper spectrum are marked with "combs". Also the gamma-ray lines used for determination of the transmission are marked.*

$^{141}Pr(^{40}Ar, 4n)^{177}Ir$

Target 270 µg/cm2

Transmission 40 %

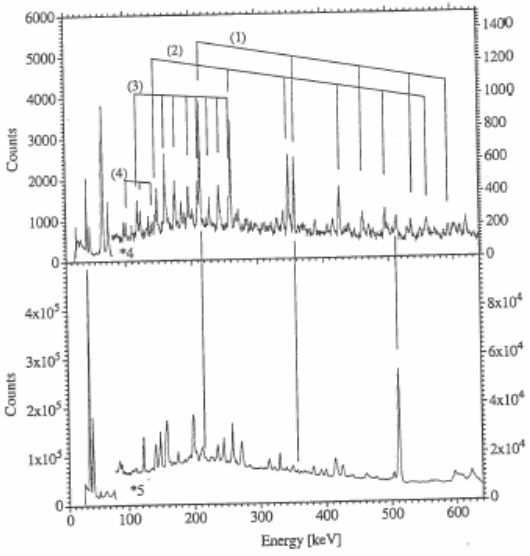


Fig. 5.5. *The singles-gamma-ray spectrum and the recoil-gamma-ray coincidence spectrum collected from the $^{40}Ar + ^{141}Pr$ reaction with a laboratory energy of 180 MeV. Band sequences identified from the upper spectrum are marked with "combs". Also the gamma-ray line used to determine the transmission and the 511 keV annihilation gamma-ray line are marked.*

M. Muikku, thesis 2000

Jurosphere setup 25 Ge detectors

$^{144}Sm(^{36}Ar, 2p2n)^{176}Pt$

Target 500 µg/cm2

Transmission 24 %

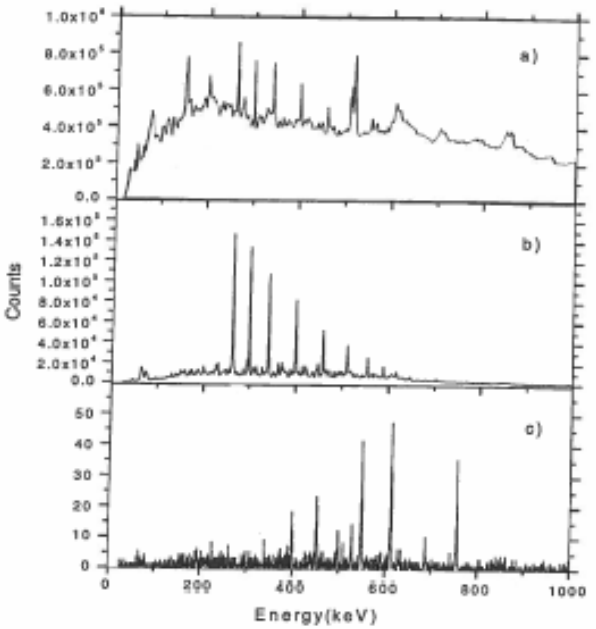


Figure 3.9 a) A γ-ray energy spectrum from the $^{36}Ar + ^{144}Sm \rightarrow ^{180}Hg^*$ reaction, b) recoil-gated energy spectrum of γ rays, c) γ-ray energy spectrum obtained by gating with fusion evaporation residues and tagging with ^{176}Hg α decays.

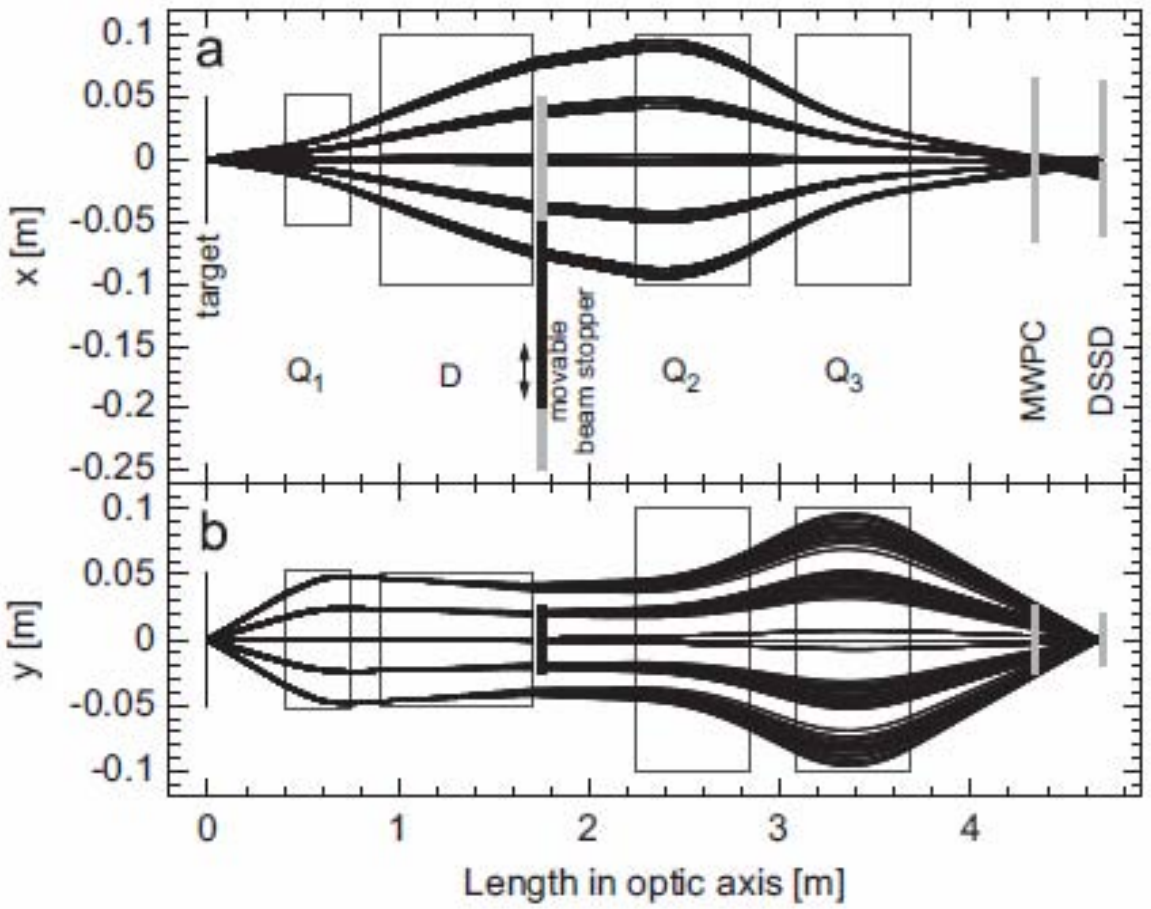
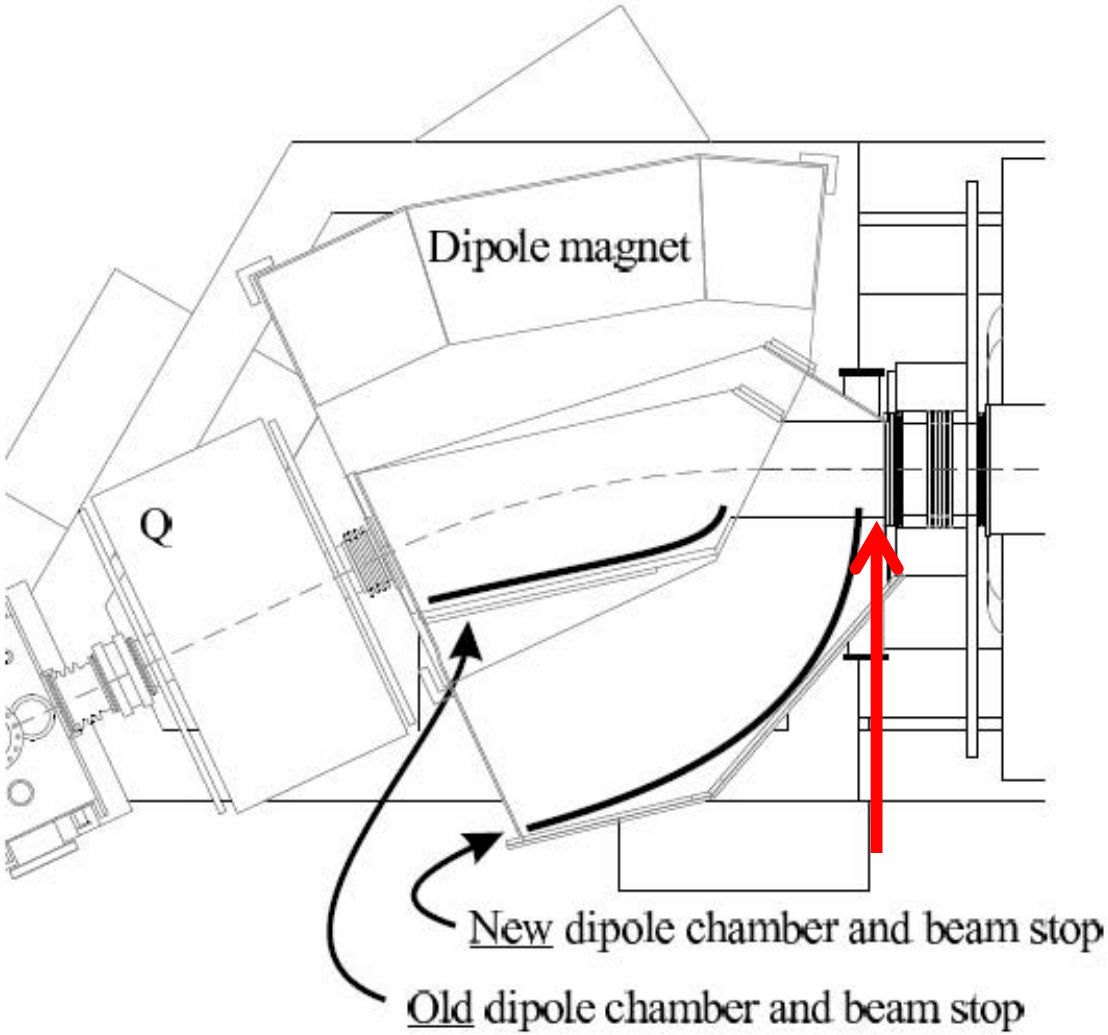


Fig. 2. Ion trajectories with combinations of horizontal and vertical initial angles of $0, \pm 12.5, \pm 25$ and $0, \pm 42.5, \pm 85$ mrad, respectively. The mass, charge and kinetic energy are those of a reference particle.



Additional beam Stopper

Figure 3.6: A drawing outlining the modifications to the dipole chamber and beam stop of the RITU separator. The dashed line shows the optical axis of the separator.