Experiment IS550 P-344:

Study of the di-nuclear system

^{A}Rb + ^{209}Bi ($Z_1 + Z_2 = 120$)

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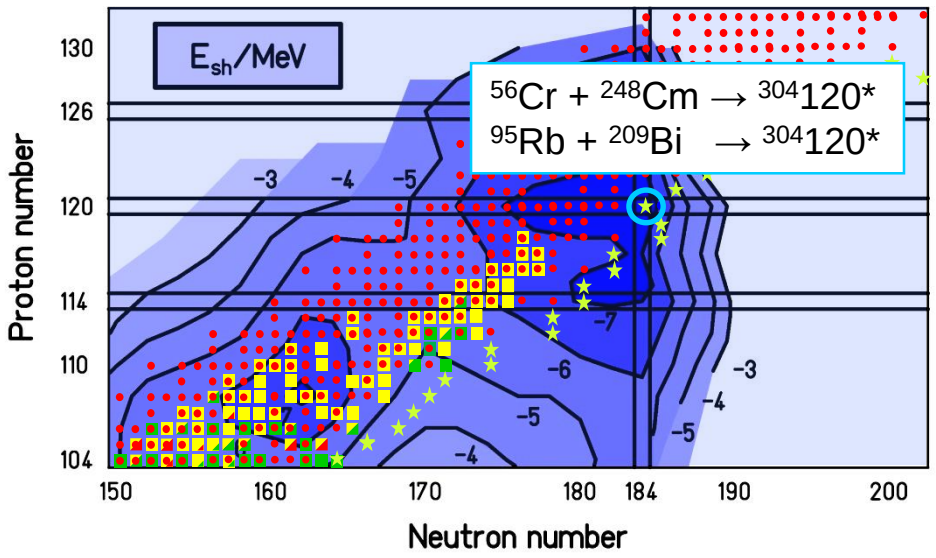
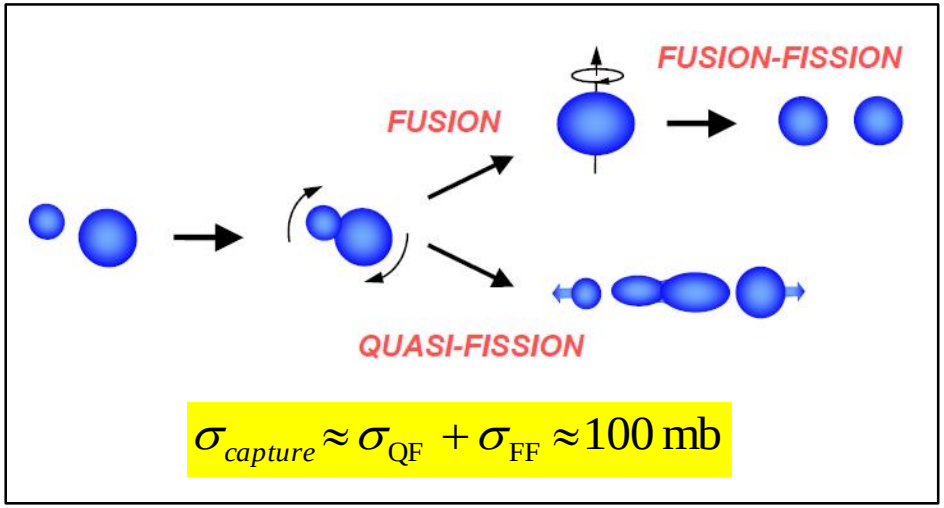
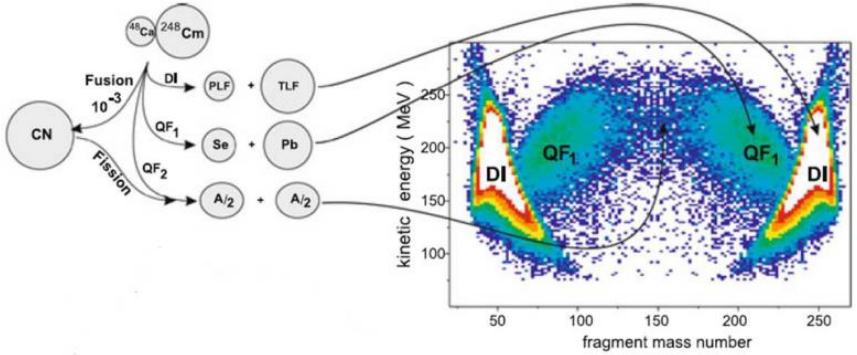
Where are the Next Magic Shells Above ^{208}Pb?



- Nuclear systems with N ≈ 184 can be reached in reactions with RIBs
- <u>problem:</u> fusion cross-sections are tiny (σ << 0.1 pb)
- <u>approach:</u> study of quasi-fission (QF) and fusion-fission (FF) reveals the stability of superheavy systems

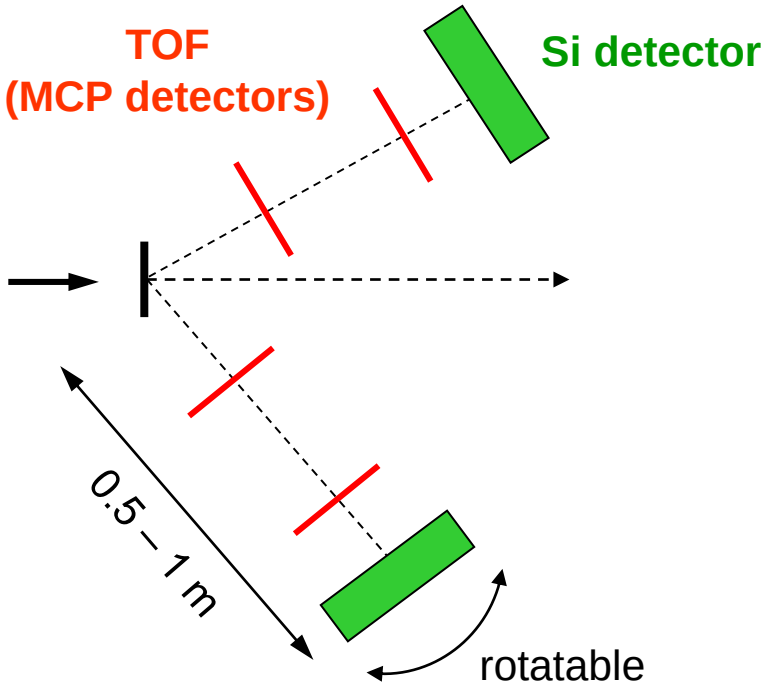


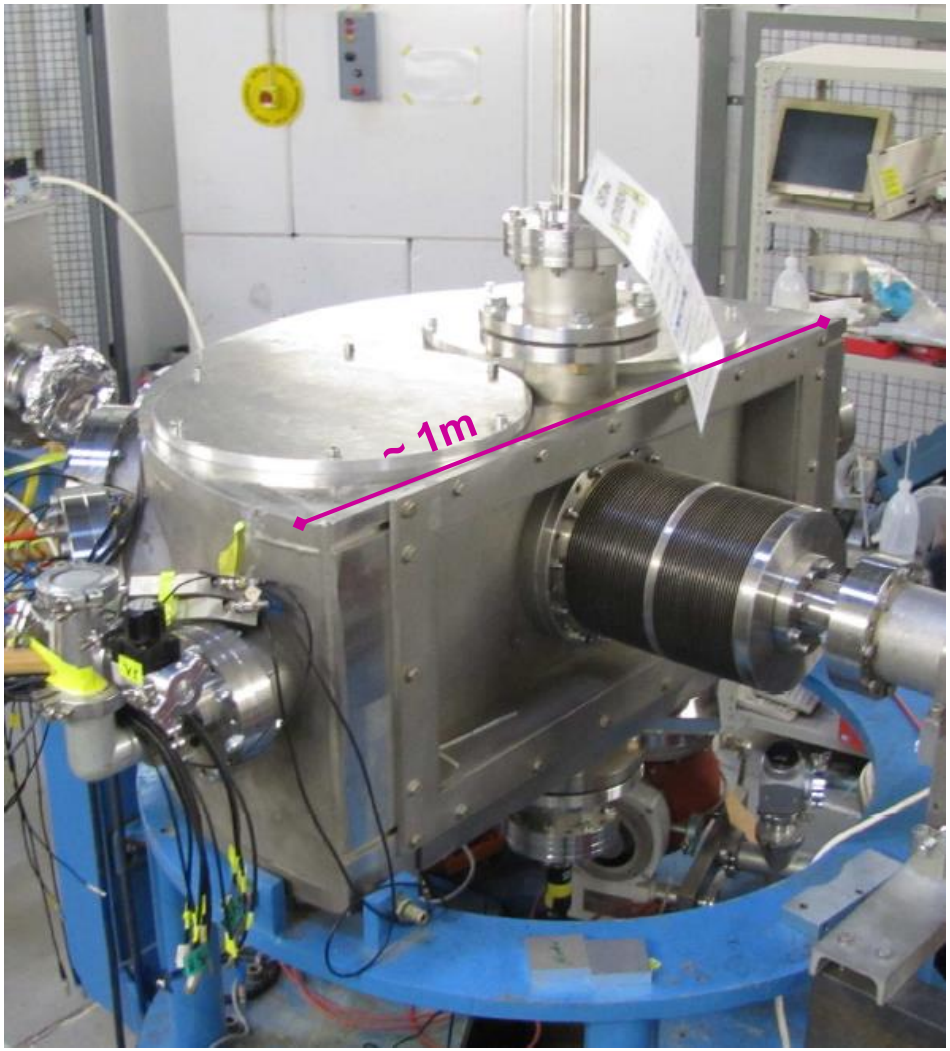


The study of QF and FF as a function of beam energy and neutron number allows a mapping of the potential energy surface

The CORSET Spectrometer

→ E. Kozulin et al., FLNR Dubna





E, TOF, θ → A, TKE, θ

ΔTOF = 180 ps

ΔA / A ≈ 1.5 %

Beamtime

Requested Beamtime:

	Tuning of the setup	Study of QF, FF
Shifts	6	3 x 12
Projectile	^{85,87}Rb (stable)	^{95}Rb
Beam energy	~ 5 MeV/u	~ (5 – 6) MeV/u

Beamtime recommended by INTC: 12 shifts of ^{95}Rb

Needs:

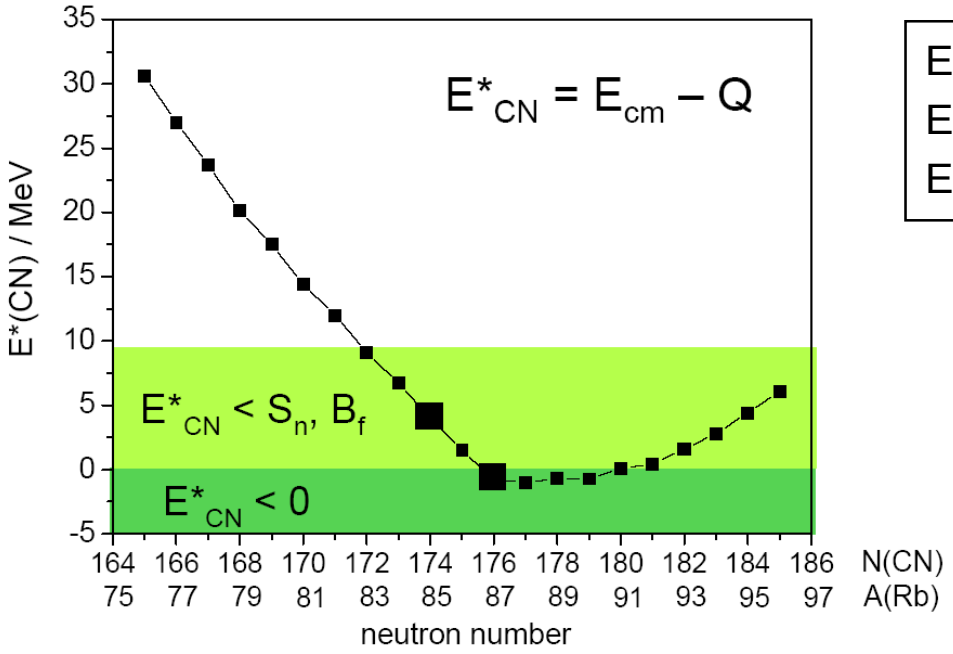
- beam intensity: ≥ 10^6 / spill
- vacuum chamber

The system ^{A}Rb + ^{209}Bi

$^{95}Rb + {}^{209}Bi \rightarrow Z_1 + Z_2 = 120,\ N_1 + N_2 = 184$

→ is the only accessible system to reach N = 184

→ is the only accessible system which provides CN excitation energies < 5 MeV



$E^*_{CN} < S_n \approx 10$ MeV → no neutron evaporation

$E^*_{CN} < B_f \approx 5$ MeV → no CN fission?

$E^*_{CN} < 0$ → no CN formation?

→ low excitation energies are equally expected in the nuclear molecule Rb + Bi