

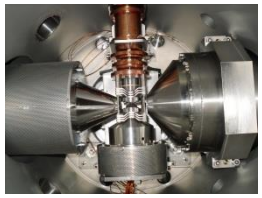
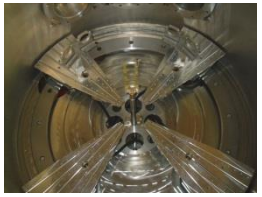

laboratoire de physique corpusculaire

Quick discussion on systematics

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Main Systematics from positron

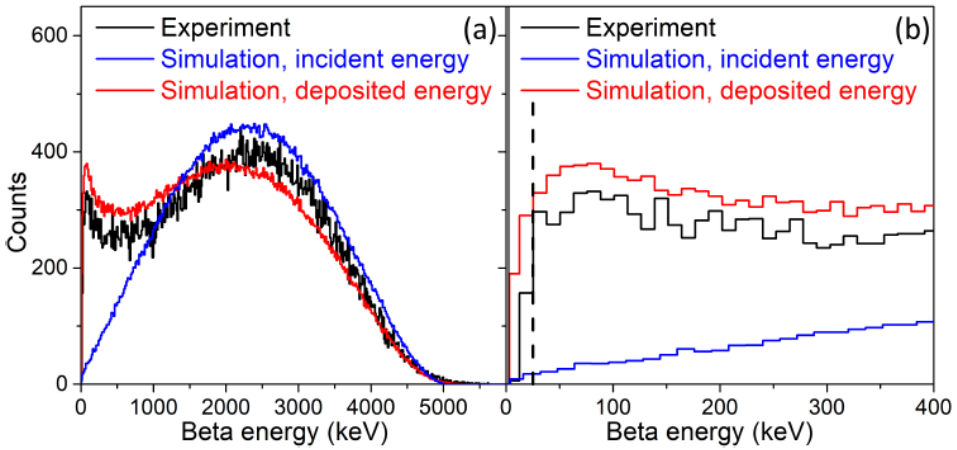
Backscattering on positron detector:

-Presently 0.2% with detection threshold at 25 keV & 15% error on G4 correction

-Reduced below 0.1% with 10 keV threshold, further reduced with progress on G4 error

→ lower det threshold

→ test G4 sim with backscat measurements



Threshold uncertainty:

-Presently 0.8% for ΔE_{th}= 12keV

-low stat

-bad det knowledge

-Reduced by ~2 with 10keV threshold

-Reduced by ~6 with ΔE_{th}= 2keV

→ characterization of detector in the 0-30 keV range

-calibration sources (tests @ ISOLDE γ & e-)

-low intensity electron gun (under dev.)

→ use alpha source for normalization (between tests & experiment)

Main Systematics from positron

Backscattering on catcher:

-Presently 2.2% with ~6.7um mylar thickness & 15% error on G4 correction

-Gain of factor ~13 with 0.5 mylar thickness for G4 error but then uncertainty on thickness not negligible (+-20%)… Real gain only factor ~8 → ~ 0.3% error on $\tilde{a}$

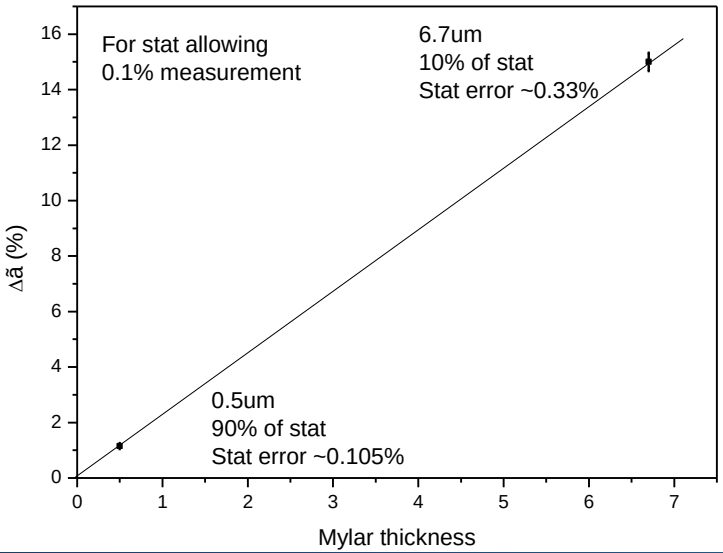
Not enough…

-To do better:

→ Measure precisely the thickness (proton E loss?)

→ Test G4 with e- source & several thickness

→ Alternate 2 thickness during experiment→ extrapolation @ 0 thickness



If linear effect: final error ~0.107%

Main Systematics from protons

Geometry:
-Need for ~0.5mm precision on detector & implant to reduce error at 0.05 % level
→ good mechanical design
→ detector to monitor implantation profile (MCP + Resistive anode)
to be ordered (but large) or designed…

Mylar thickness:
-Presently 0.2% for uncertainty of 0.15um → improved with statistics & new mylar
0.5+- 0.1um mylar → 0.15% error (not enough)
→ could be measured more precisely with proton shift
→ effect included in extrapolation with 2 thickness

Si dead layer thickness:
-Presently 0.5% for uncertainty of 0.3um → improved if dedicated measurements
→ Precise measurement possible with α source at different angles (Eshift vs angle)
(gain of factor ~10 seems possible)
→ Need for dedicated setup

Detector calibration slope:
-Presently 0.9% for relative uncertainty of 0.2% on slope
→ need for very precisely known proton energy peaks (33Ar?)
Several peaks with 1keV precision → 0.1-0.15% on ã , seems hard to do better…