

Mott Progress Report on Schedule, Target Ladder and Beam Dump Plate

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August 14

Schedule

➤ Present work schedule

- Sept 28 HCO begins
- **Nov 1 Mott tunnel work complete**
- Nov 4 2K recovery begins
- **Nov 8 Mott commissioning plan ready**
- Nov 9 HCO ends

- Nov 9 Injector setup begins
- Nov 11 2K recovery ends
- Nov 11 Pulsed beam to FC1
- Nov 16 Pulsed beam to FC2
- **Nov 16 Mott ready for beam**
- Nov 21 Pulsed beam to INJ spectrometer
- Nov 24 Pulsed beam to OR dump (end of injector)

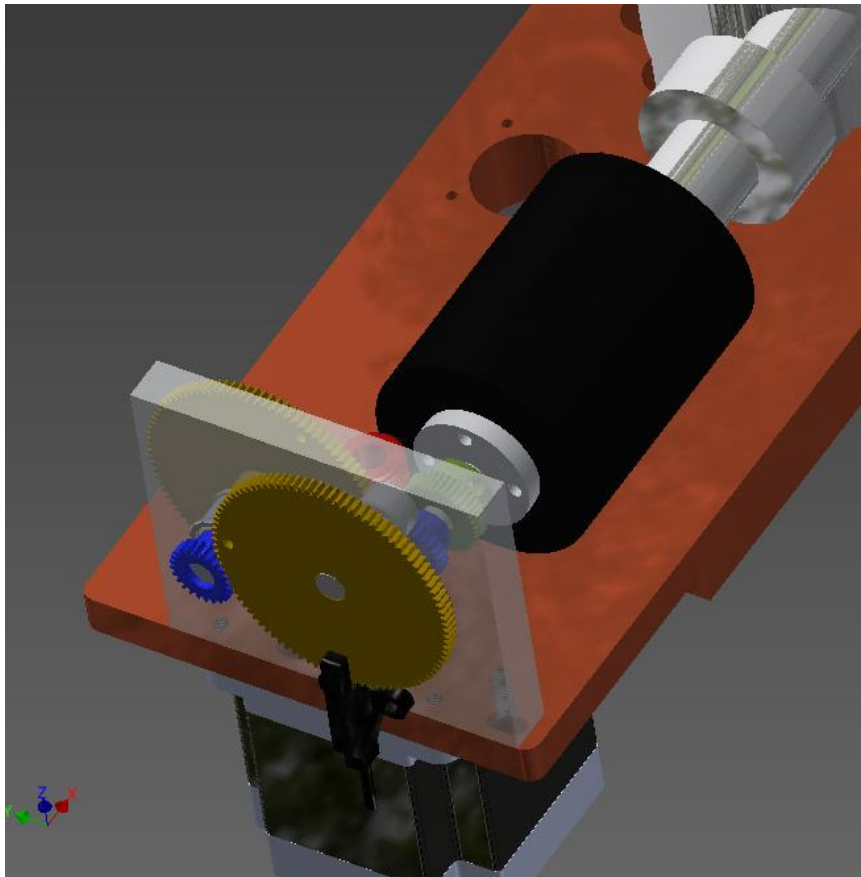
- Nov 28 Run through Thanksgiving
- Dec 18 1-pass pulsed beam at 2.2 GeV
- Dec 20 Winter shutdown

- Feb 5 ACC-II begins
- May 7 ACC-II ends

Target Ladder

Budget approved for new target ladder parts and assembly.

- Gears and fixture plate for precision position control designed and ordered
- STAC-5 stepper motor controller software written and testing = good
- Target ladder (0.16") should be ordered today
- Viewer machining and adapter plate requirements known, yet incomplete



/cs/opshome/edm/WFO/INJ/INJ_Mott_Ops.edl

COMM Health: Motor NO_ALARM Mott Ladder Related

Foil Select

Current steps: 110000 steps

	Mount Type	Foil Desc	Saved Pos
Home	Home: n/a	Fully retracted	0 steps
Req	Foil 1: Circular	Cu: 12 um	10000 steps
Req	Foil 2: Rectangular	Cu: 4.1 um	20000 steps
Req	Foil 3: Rectangular	Au: 0.05 um	30000 steps
Req	Foil 4: * Damaged *	Ag: 4.5 um	40000 steps
Req	Foil 5: Circular	Ag: 1.6 um	50000 steps
Req	Foil 6: Circular	Ag: 0.45 um	60000 steps
Req	Foil 7: - Empty -		70000 steps
Req	Foil 8: Circular	Au: 0.1 um	80000 steps
Req	Foil 9: Circular	Au: 0.35 um	90000 steps
Req	Foil 10: Circular	Au: 1.0 um	100000 steps
Req	Foil 11: Circular	Au: 5.0 um	110000 steps
Req	Foil 12: Circular	Cu: 1.0 um	120000 steps
Req	Foil 13: Circular	Cu: 8.0 um	130000 steps
Req	Foil 14: Circular	Cu: 18 um	140000 steps
Req	Foil 15: Circular	Ag: 10 um	150000 steps
Req	Foil 16: Circular	Ag: 15 um	160000 steps

Status: Ready

ABORT

(wmoore, 2013-08-09)

Dump Plate : motivation to reduce backscatter

PHYSICAL REVIEW

VOLUME 162, NUMBER 2

10 OCTOBER 1967

Backscattering of Electrons from 3.2 to 14 MeV*

TATSUO TABATA

Radiation Center of Osaka Prefecture, Sakai, Osaka, Japan

(Received 30 March 1967)

“...angular distribution of backscattered electrons and the backscattering coefficient were measured for **Cu, Ag, and Au** targets of **various thicknesses** at the incident energy of **6.08 MeV**, and for **Be, C, Al, Cu, Ag, Au, and U** targets of effectively **semi-infinite thickness** in the energy range **3.24-14.1 MeV**.”

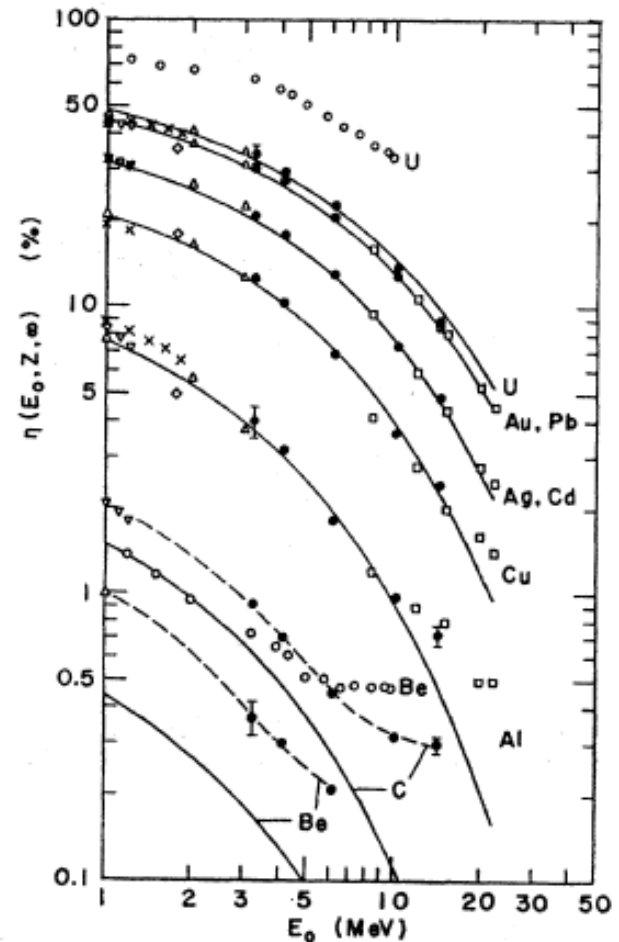
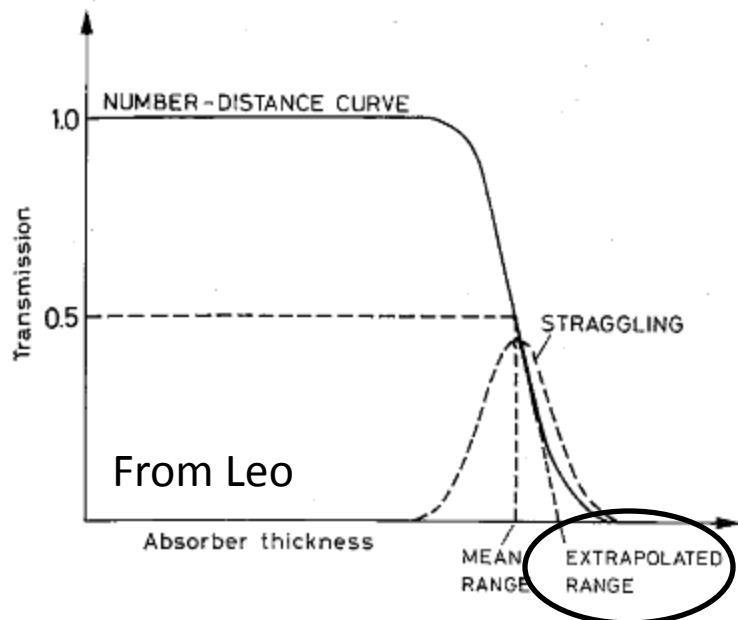
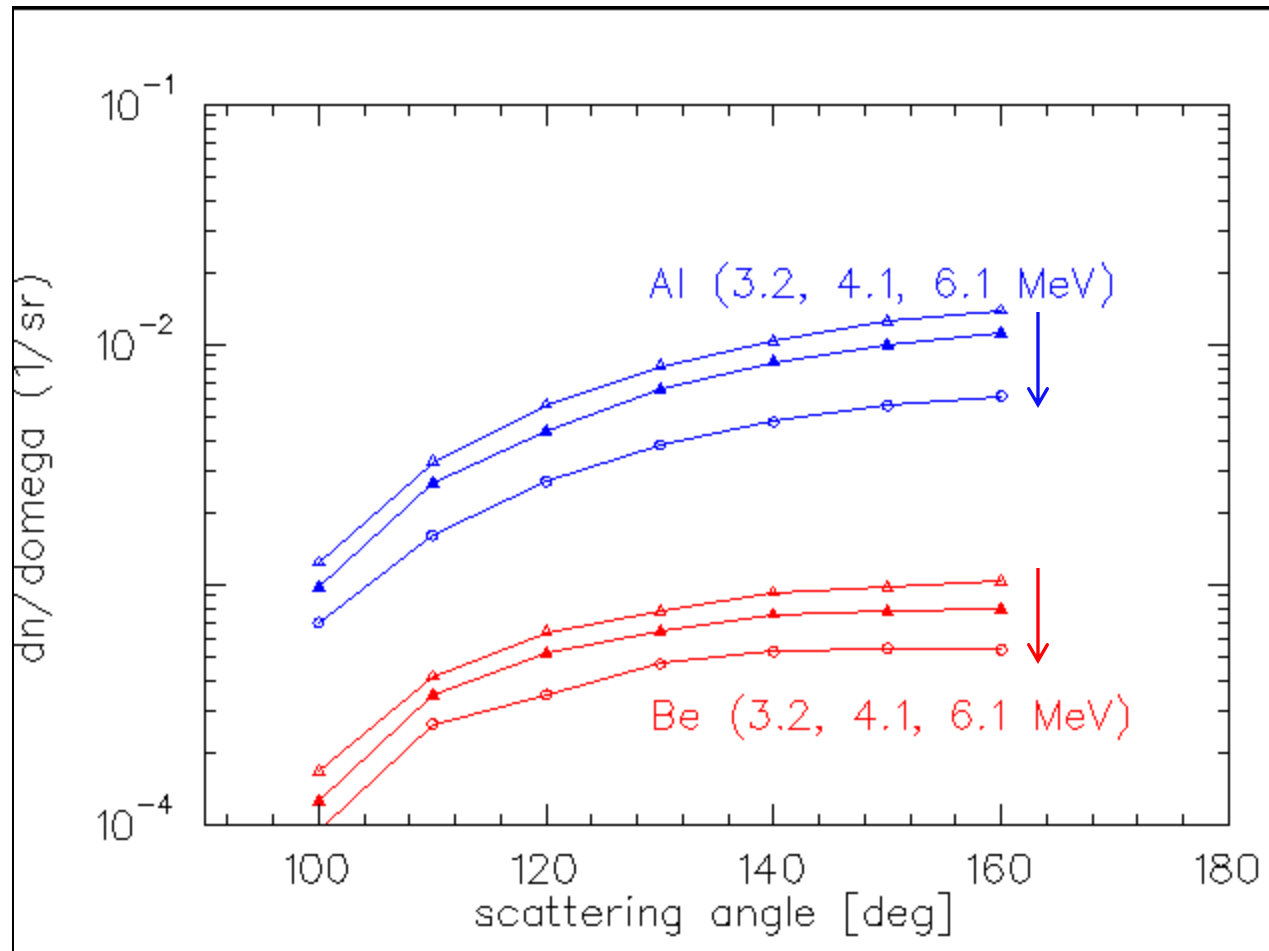


FIG. 8. Dependence of total backscattering coefficient $\eta(E_0, Z, \infty)$ for semi-infinite targets upon incident energy E_0 .

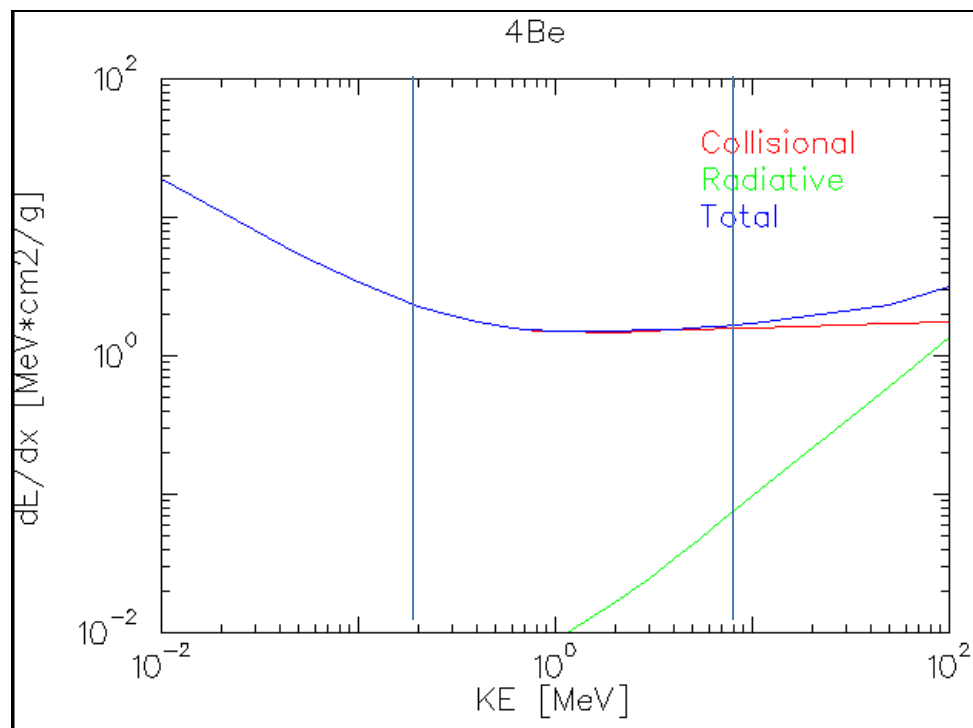
Dump Plate : motivation to reduce backscatter

From same paper, angular distributions for semi-infinite thickness targets.



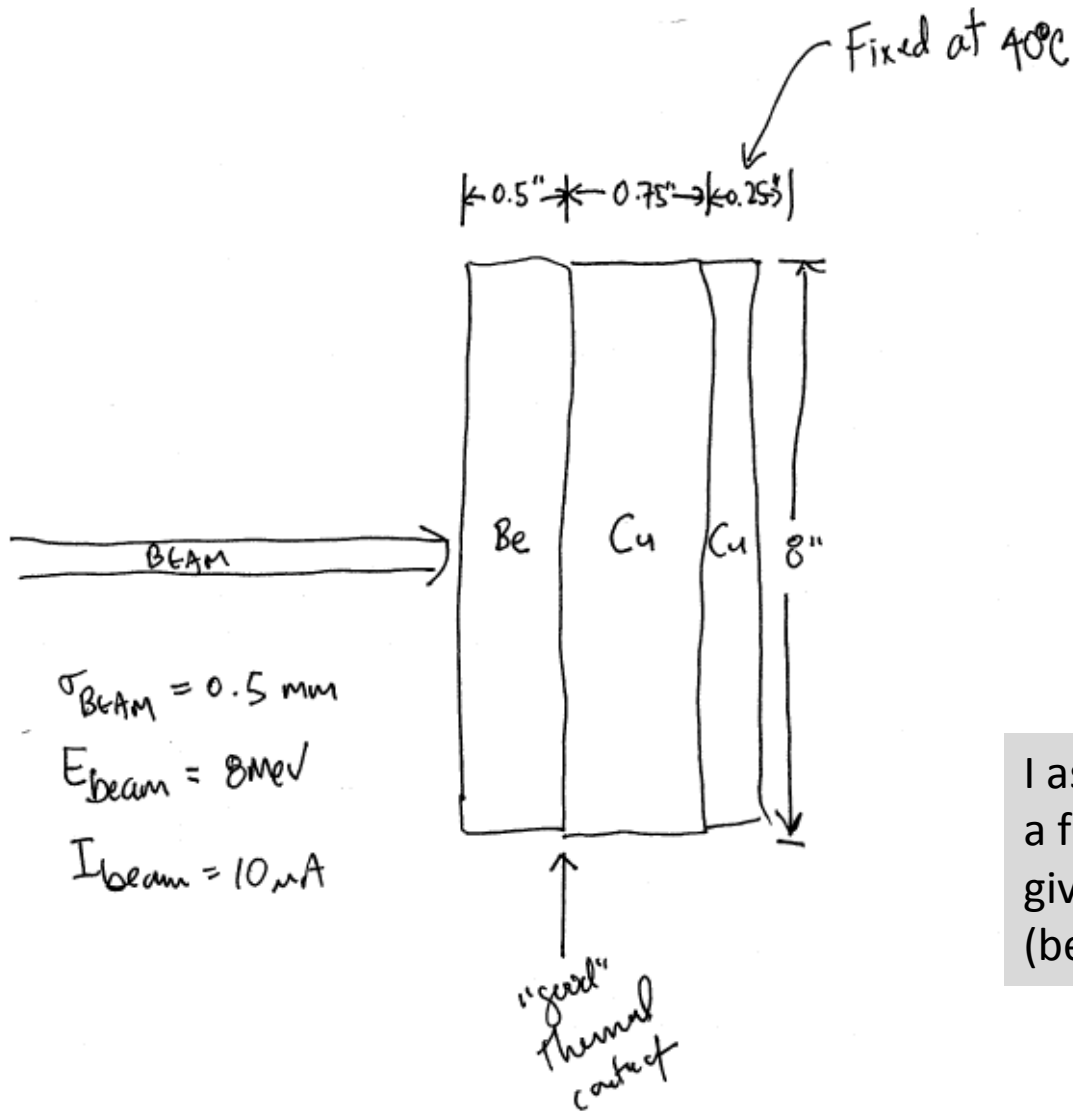
Dump Plate : energy loss

200keV – 8MeV energy loss is nearly all collisional at 1.6 MeV-cm²/g



KE	Uniform Loss (1.6 MeV-cm ² /g)	Katz and Penfold Rev. Mod Phys 24 (1952) 28	Practical Range ($\rho_{\text{Be}} = 1.848 \text{ g/cm}^3$)	Turn-Around Range
3 MeV	1.88 g/cm ²	1.48 g/cm ²	0.8cm	0.40cm
5 MeV	3.12 g/cm ²	2.54 g/cm ²	1.4cm	0.70cm
8 MeV	5.00 g/cm ²	4.14 g/cm ²	2.3cm	1.15cm
10 MeV	6.25 g/cm ²	5.14 g/cm ²	2.8cm	1.4cm

Dump Plate : worst case thermal distribution



	<u>Be</u>	<u>Cu</u>
ρ	1.848 g/cm ³	8.920 g/cm ³
T_{melt}	1287°C	2927°C
$\frac{dE}{dx}$	1.6 MeV cm ² /g	"

I asked Dave Meekins if he would give us a first pass look at thermal distribution given uniform energy loss in volume (beam radius * E/(dE/dx)).