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

Joe Grames
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 0R dump (end of injector)

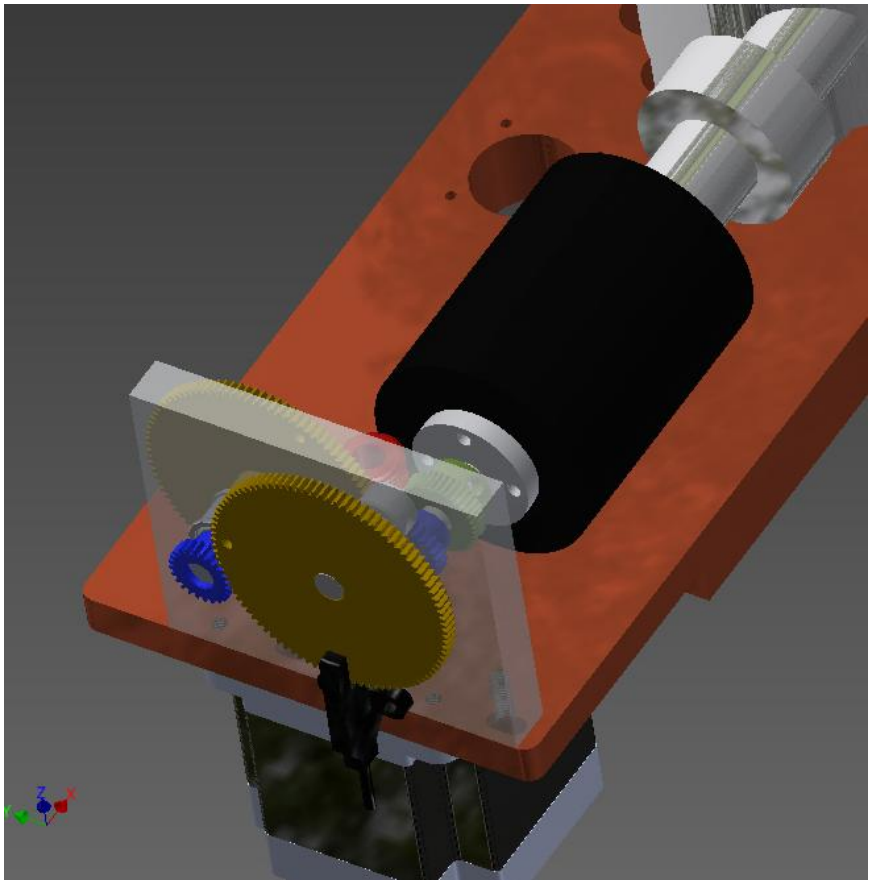
  - Nov 28 Run through Thanksgiving
  - Dec 18 1-pass pulsed beam at 2.2 GeV
  - Dec 20 Winter shutdown

  - 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



Dump Plate : motivation to reduce backscatter

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Backscattering of Electrons from 3.2 to 14 MeV*

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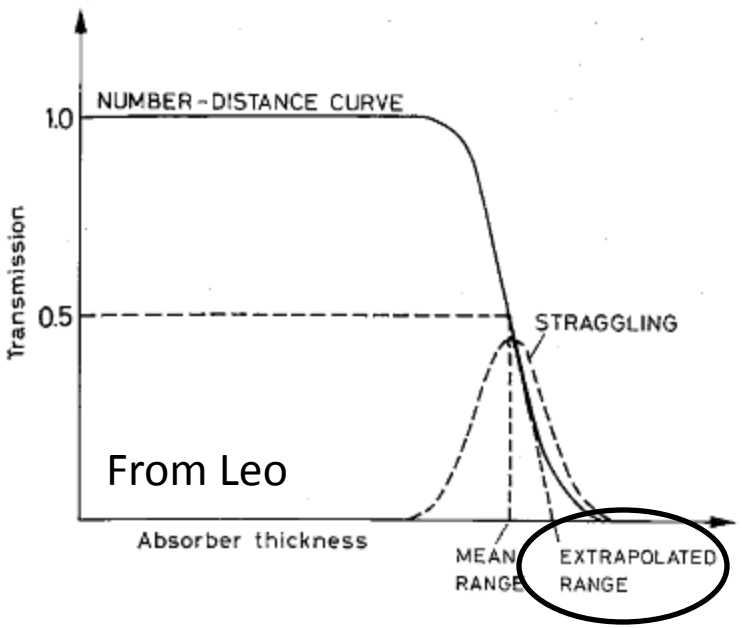
(Received 30 March 1967)

*"…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**."*



From Leo

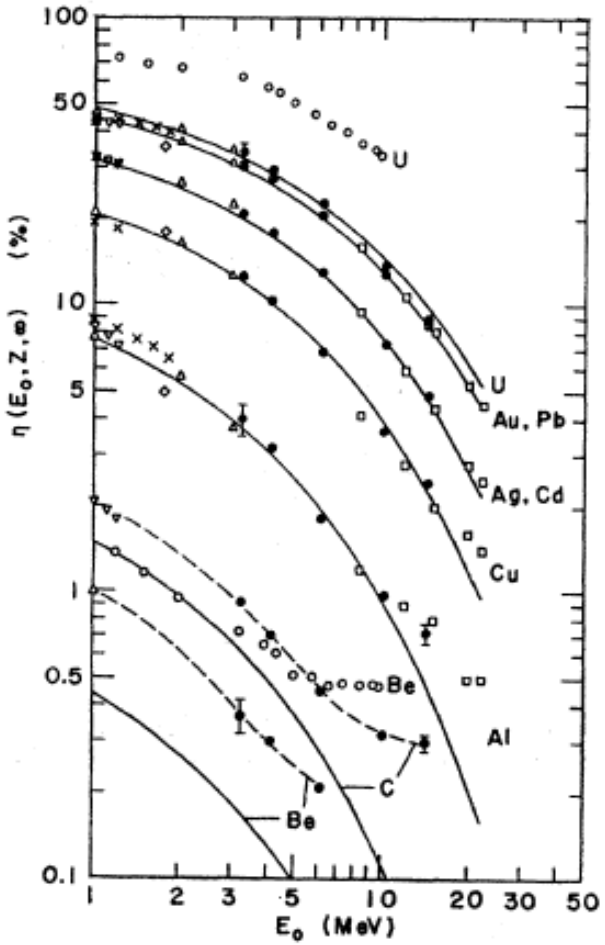
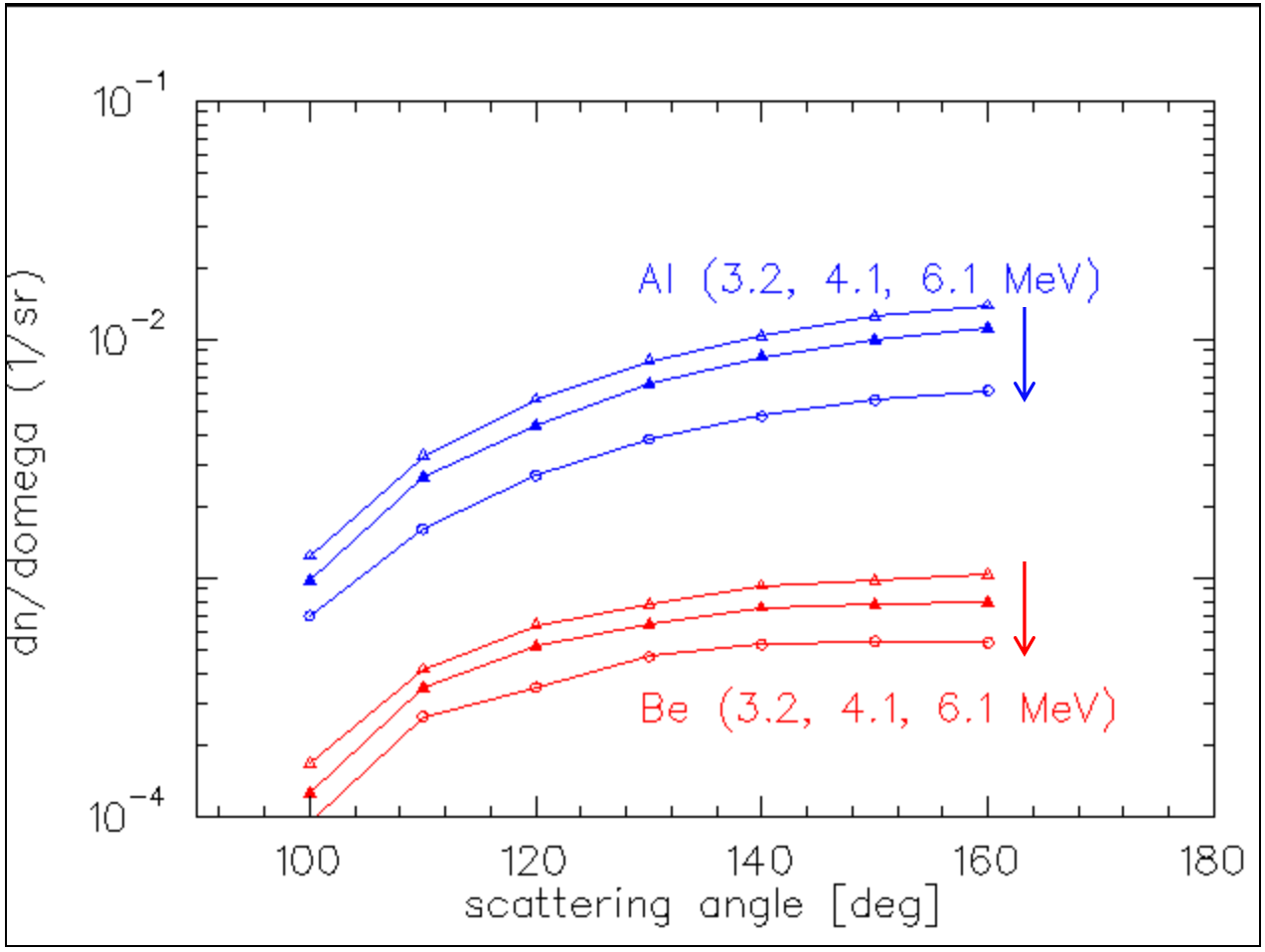


FIG. 8. Dependence of total backscattering coefficient $\eta(E_0, Z, \infty)$ for semi-infinite targets upon incident energy E_0.

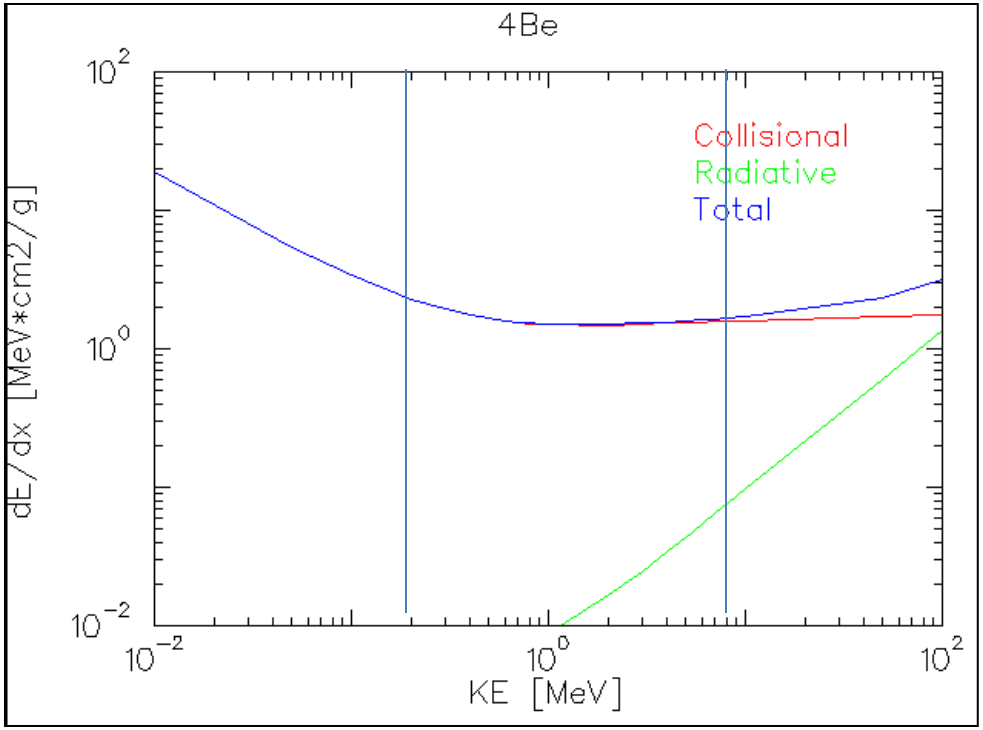
Dump Plate : motivation to reduce backscatter

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



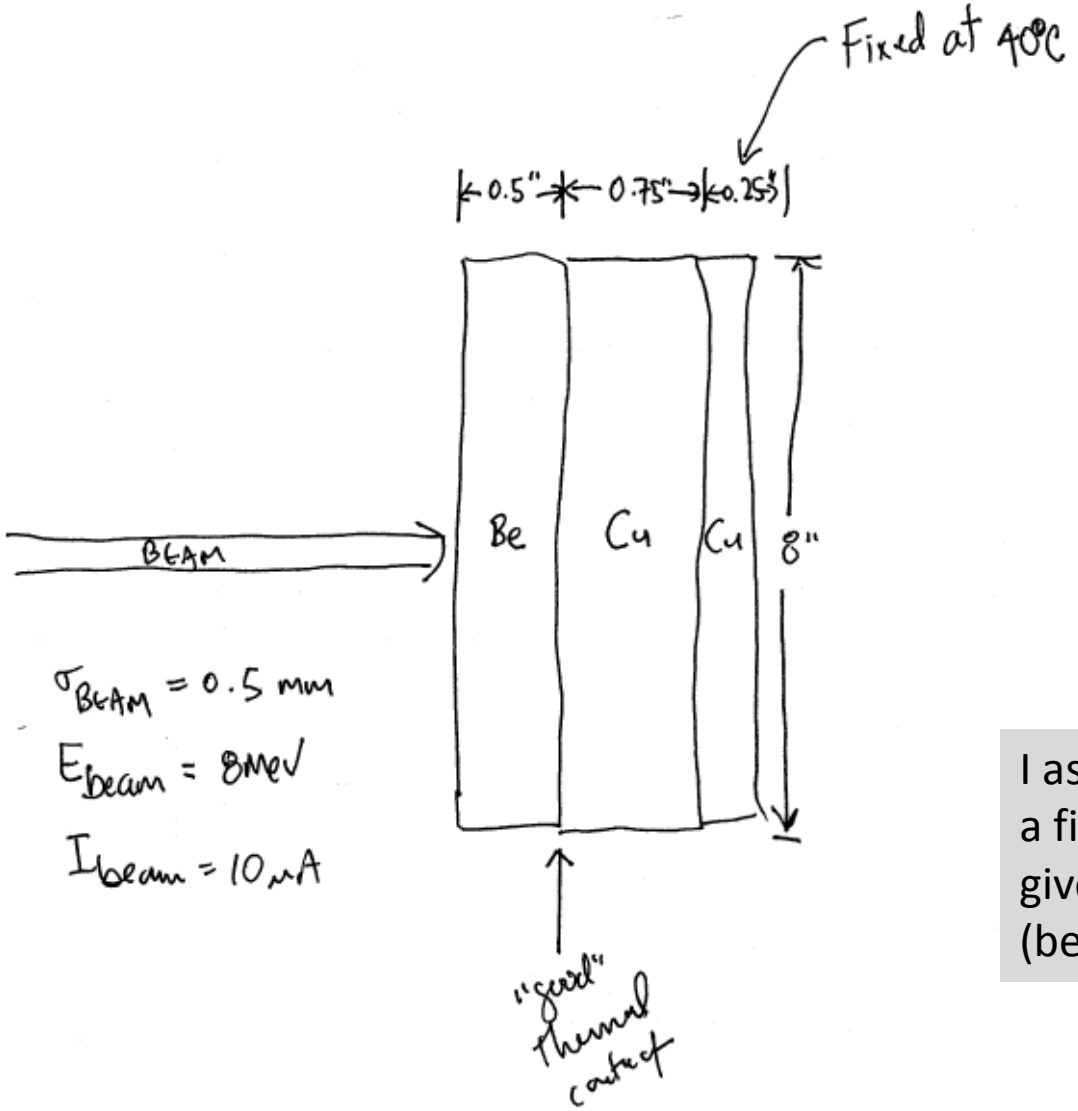
Dump Plate : energy loss

200keV – 8MeV energy loss is nearly all collisional at 1.6 MeV-cm^2/g



KE	Uniform Loss (1.6 MeV-cm2/g)	Katz and Penfold Rev. Mod Phys 24 (1952) 28	Practical Range (ρ_{Be} = 1.848 g/cm3)	Turn-Around Range
3 MeV	1.88 g/cm2	1.48 g/cm2	0.8cm	0.40cm
5 MeV	3.12 g/cm2	2.54 g/cm2	1.4cm	0.70cm
8 MeV	5.00 g/cm2	4.14 g/cm2	2.3cm	1.15cm
10 MeV	6.25 g/cm2	5.14 g/cm2	2.8cm	1.4cm

Dump Plate : worst case thermal distribution



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

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