

Gold experiment plans

Experiment Run Time Estimate (per energy or beam rate configuration)

- Setup (1 shift)
 - ✧ Set and measure momentum, momentum spread
 - ✧ Set optics/beam size
 - ✧ BCM calibration
- Systematics (0.5 shift)
 - ✧ PMT HV gain check
 - ✧ Instrumental asymmetries vs. beam size, energy, position, intensity
 - ✧ Measure and minimize backgrounds
- Target Measurements (each of 14 foils)
 - ✧ 30 min for systematic checkout – may include full timing spectra
 - ✧ Statistical uncertainty 0.25% (assuming $I < 10 \mu\text{A}$, $R < 2 \text{kHz}$)

Mott Gold Experiment Run Time Summary

Assumes:

Beam current < 10uA

DAQ Rate < 2 kHz

dP/P at least 0.25%

Run time < 1 hour => 1 hour to verify stability

K.E.	MeV	3.0 @ 31MHz	5.0 @31MHz	6.2 @31MHz	6.2 @499MHz	8.0 @31MHz
Setup	Hour	8	8	8	0	8
Systematics	Hour	4	4	4	4	4
Foil Systematics	Hour	7	7	7	7	7
Foil Statistics	Hour	14	14	16	16	24
Total Time	Shift	4.1	4.1	4.4	3.4	5.4

For full experiment requires 21.4 shifts ~ 7 days @ 100% efficiency

Things we do to complete the experiment

Beam Studies

- Suleiman: background suppression by FADC and TOF veto (ATLIS 14559, 4hrs)
- Games: target positions & instrumental asymmetries (ATLIS 14558, 4hrs)
- Games: demonstrate statistical stability for 0.05, 0.5, 1 um targets (ATLIS TBD, 3hrs)

Analysis & Tests

- Moser: add intensity into analysis calculations
- Mahmoud/Stutzman: target thickness measurements

Simulation & Theory

- McHugh/Opper: complete G4Mott model & simulate experiment
- Sinclair/Gay: work w/ Xavier and Charles to bound the Sherman function uncertainty

Proposing/Lobbying

- Games/Poelker: Making the case for CEBAF beam time in 2015

Running/Analyzing

- Mott Collaboration: we need to discuss when/how we take and later analyze the data