CIS obligations, research projects, jobs

Moving to new lab space, organizing our stuff, cleaning out

CEBAF:

1. Support operations
2. Improve, quantify 5 MeV mott accuracy
3. Bubble chambers, part1 and 2
4. Brock cavity bunchlength monitor
5. Characterize beam at 4K
6. Parity violation experiments (better spin flipper, stewart platform, 2kHz flipping, HC beam size monitor?)
7. 200kV gun and beamline, installed when new ¼CM gets installed

FEL:

1. DarkLight commissioning run Summer 2015
2. Project E, plus any other projects that might provide $
3. DarkLight experiment (big job, they want ~ 800C per day, for 6 months, they want Shukui to be liaison)
4. Maintain the present vent/bake gun: bakeouts, activations, HV conditioning
5. Improve the gun, small inverted, large inverted or frankengun, need load lock, CsK2Sb photocathode
6. Improve the drive laser if possible
7. New injector construction, New injector installation, baking this beamline. Should happen concurrent with installation of load locked gun.

Test Cave 10 MeV beamline, full time job for a few people:

1. Designing it
2. Costing it
3. Building it
4. Operating it with Users

GTS:

1. HV tests (R28 black with NEG sheet, R30 black, R30 coated, TiN:Al, TiN:Cu)
2. A functional gun operating at 350kV with CsK2Sb depo chamber
3. Beamline for lifetime
4. Beamline for beam characterization at nC bunch charge
5. Beamline for kicking tests
6. Magnetized beam?

Characterizing photocathodes from SVT, and any other photocathodes we want to study

1. JLab miniMott
2. SLAC Cathode Test Stand
3. Harding design
4. Low voltage QE test chamber: new photocathodes from SVT and bulk GaAs with different cleave planes.

Brock Roberts:

1. Bunchlength monitors
2. Harmonitron
3. Kickers, shapers
4. A simple warm CW rf gun?

Vacuum R&D:

1. Cryopumping to improve vacuum?
2. Homemade cryopump, with Kevin Jordon and nanotubes?
3. Saxet gauge?
4. Gauge evaluation, instructions to the world for making measurements in -12 Torr range
5. Reliable and ~ easy homemade NEG coating

Lasers:

1. Learning to make our own fiber preamps, amps
2. Evaluating the best method for making quality ps light using diodes and fibers: analog/digital gain switching, DC light + fiber modulator, pros/cons of each method
3. Changing the rep rate, implementation at CEBAF
4. Replacing the modelocked MO laser at FEL with a diode/fiber based system?
5. Lasers at test cave and at GTS

Field Emission tests at EEL 117

1. TiN:Al
2. TiN:Cu
3. An ion source to implant/sputter-clean entire electrode, might help us speak more definitively about gas conditioning and the nature of field emission
4. IonBond doesn’t seem interesting in coating 6” aluminum and copper balls….

Lifetime tests we’ve talked about:

1. Can we use cm size laser beams, does lifetime continue to scale…?
2. Green vs red lifetime
3. Lifetime using multi-alkali activation
4. Lifetime for different GaAs cleave plane orientations, channeling?

CsK2Sb studies:

1. Reliable recipe using effusion sources
2. Appreciating Sb thickness, substrate dependence
3. KOH and CsOH as means to simplify deposition? Get rid of gas heaters and effusion sources
4. Adapting what we know to pucks for an actual gun
5. Understanding relationship of different recipes to beam quality

PEPPo, time to finish it, publish results

Bubble Chamber, a much bigger job than we anticipated

5 MeV Mott, end in sight?

All of these projects require GEANT4 modeling, which seems to represent the log jam

Assorted:

Andrei Afanasev and Oksana, building a photocathode model with polarization. This model could be used with genetic algorithm to optimize polarization. Charlie, and Inez, and Alicia, and SVT?

Marcy and Tim Gay and the optical polarimeter

A bunchlength monitor that relies on electro-optic sampling and two bunches, one a probe

Bhabana and QPeak: powerful green laser with rf pulses

Papers, conferences, reviews, proposals, etc.,

Encouraging Fay’s barrel polishing tests...

MEIC gun studies, nC bunches, magnetized beam, etc.,