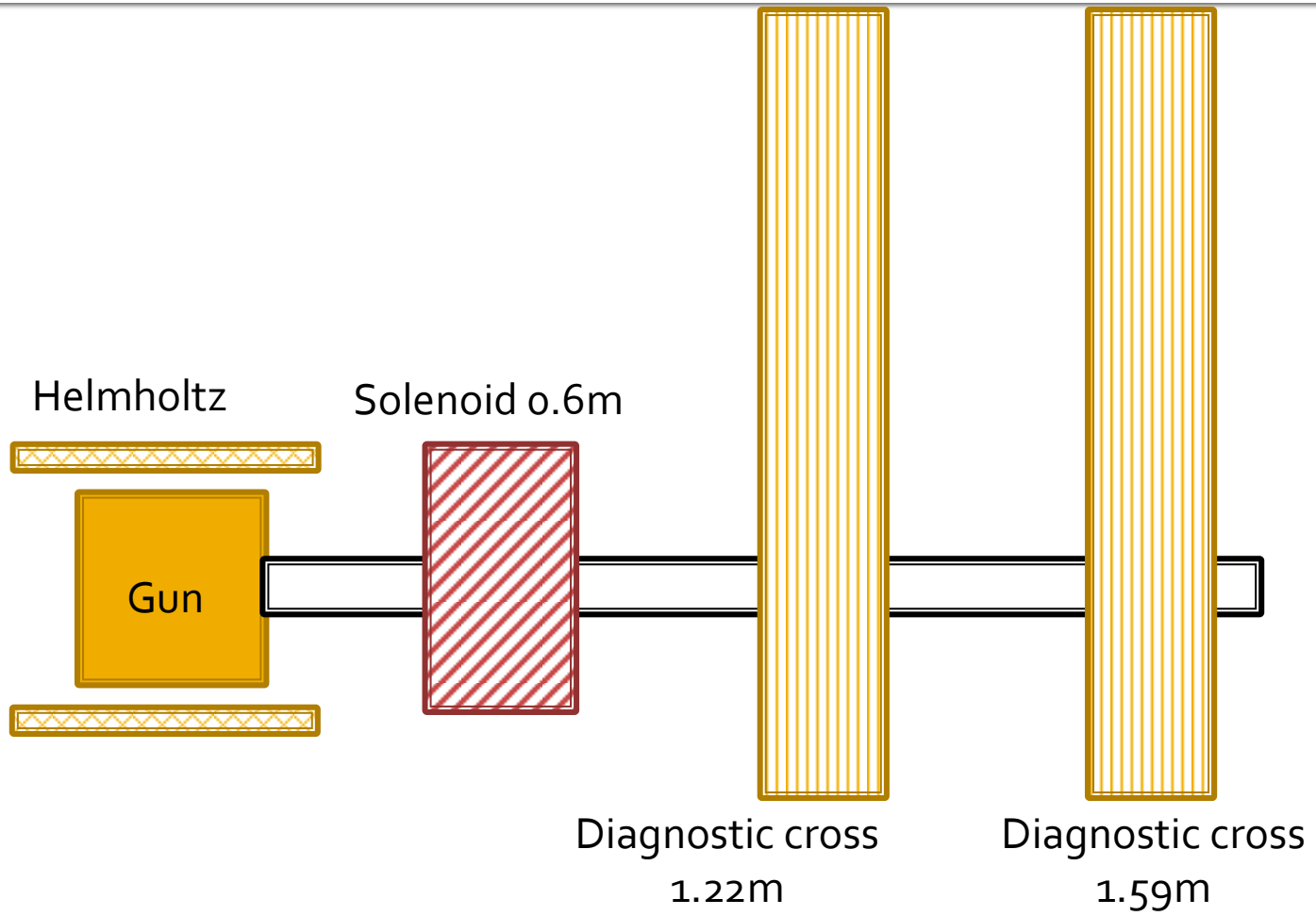
Fay Hannon
11/10/2015

Magnetized Beam LDRD

Layout of VA beamline

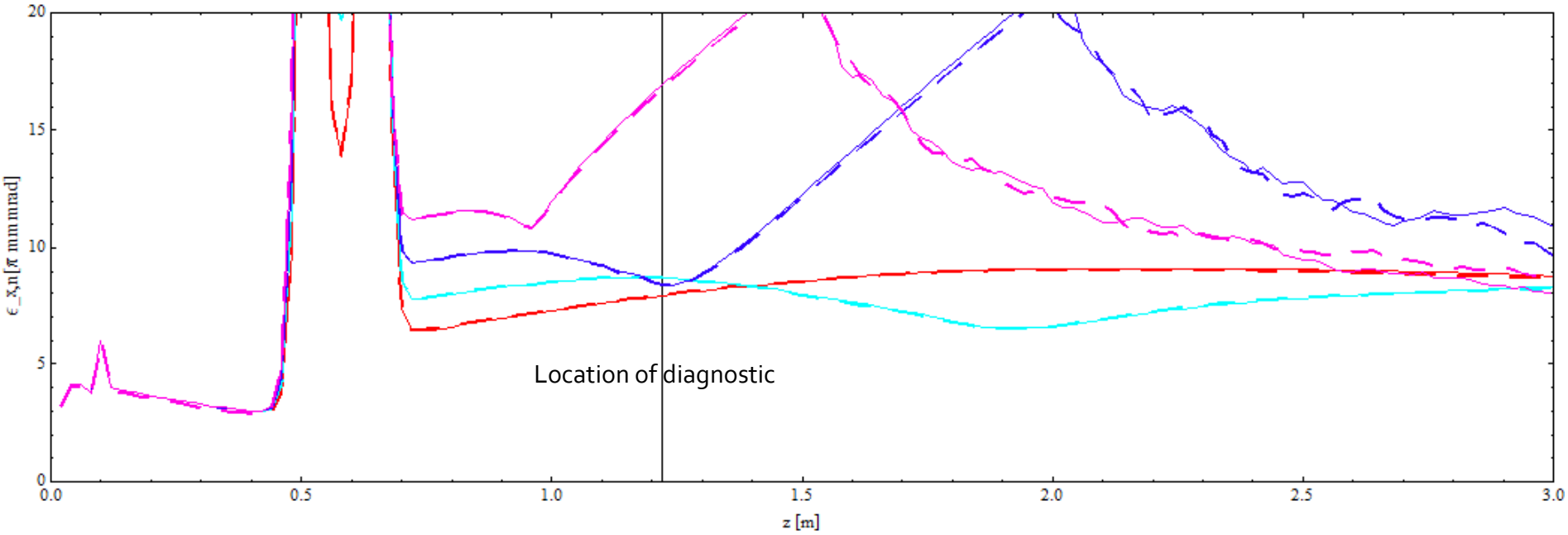


Measurements

- Lifetime (dump charge)
  - Will need solenoids + correctors to get 100% transmission
- Emittance
  - Only have location for 1 slit ATM
- Magnetization
  - Need slit then screen

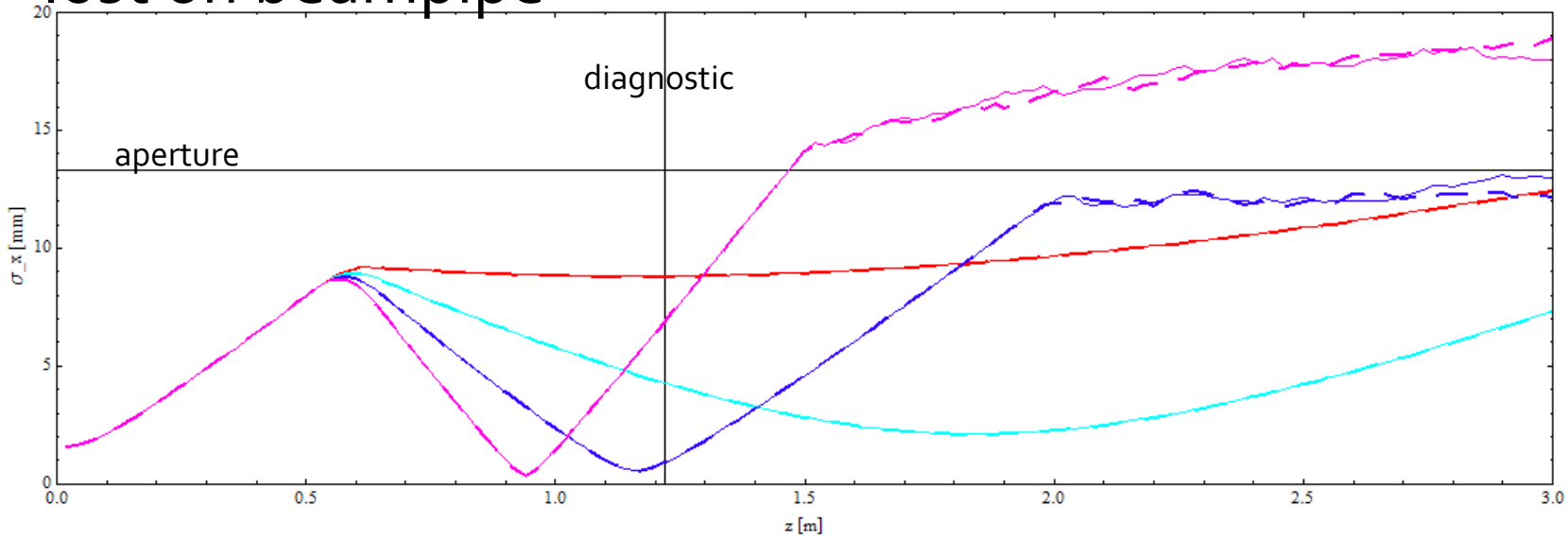
Emittance

- Can't do solenoid scan as SC dominated.
  - Exception is thermal emittance
- Vary solenoid, change emittance, SC non-linear, so can't make a fit.



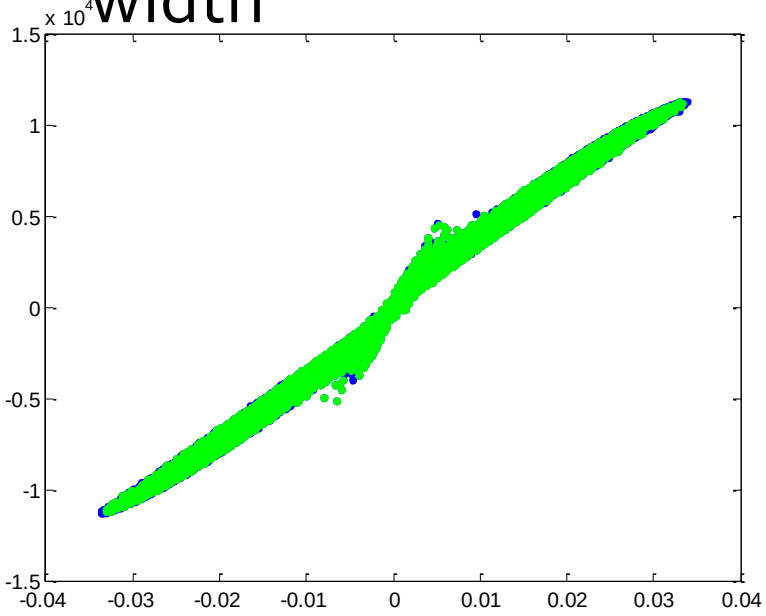
Emittance

- For a good measurement need
  - Laminar beam ish
  - Reasonable size at slit
  - Narrow, thin slit
- With solenoid at present location beam is big – gets lost on beampipe

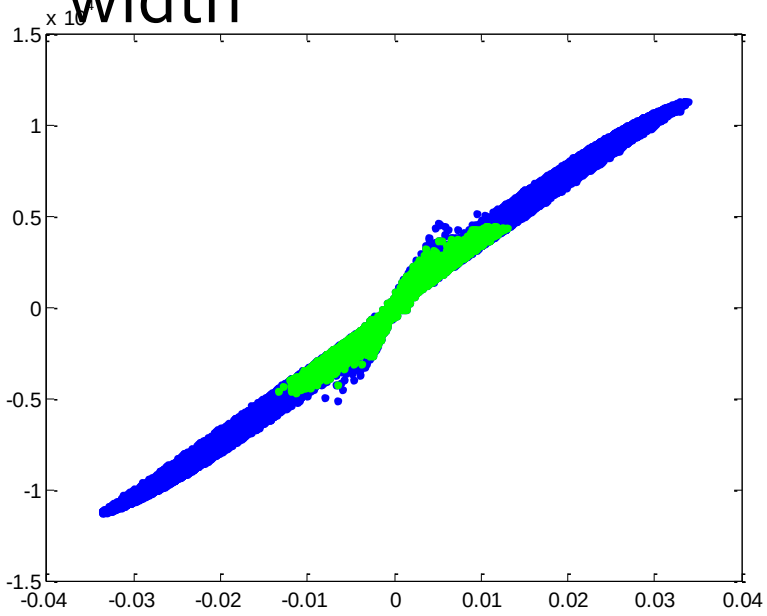


Virtual experiment

- 1mm thickness, 20um width



- 3mm thickness, 20um width



Green, particles that make it through the slit

Emittance

- If beam is divergent, beamlets will overlap
  - Difficult to fit, then interpolate to give phase space.
- Double slit
  - Use correctors to scan one slit, then the other and collect particles with Fcup. 3 diagnostic crosses.
- Single slit
  - Use correctors to scan one slit, image on viewer and process to get phase space. 2 diagnostic crosses

Options

- Modify the bellows after the gun valve (can reduce by ~7.2cm)
- Can get first diagnostic cross closer.
- Design slit to work both scenarios