Preliminary gun kick data

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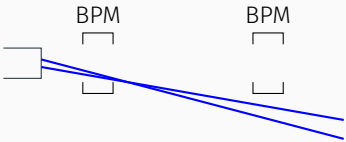
The problem with gun field asymmetry

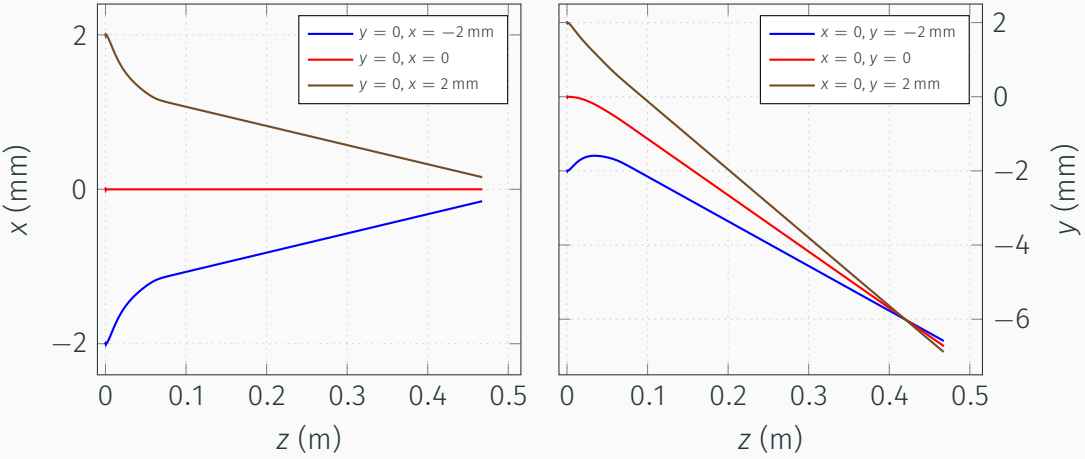
- Beam angle from gun irrelevant in itself
- Any gun will cause angle + displacement with non-central laser spot
- But strong correctors introduce multipoles
- Asymmetric gun field also increases emittance

Why is the gun kick not trivial to measure?

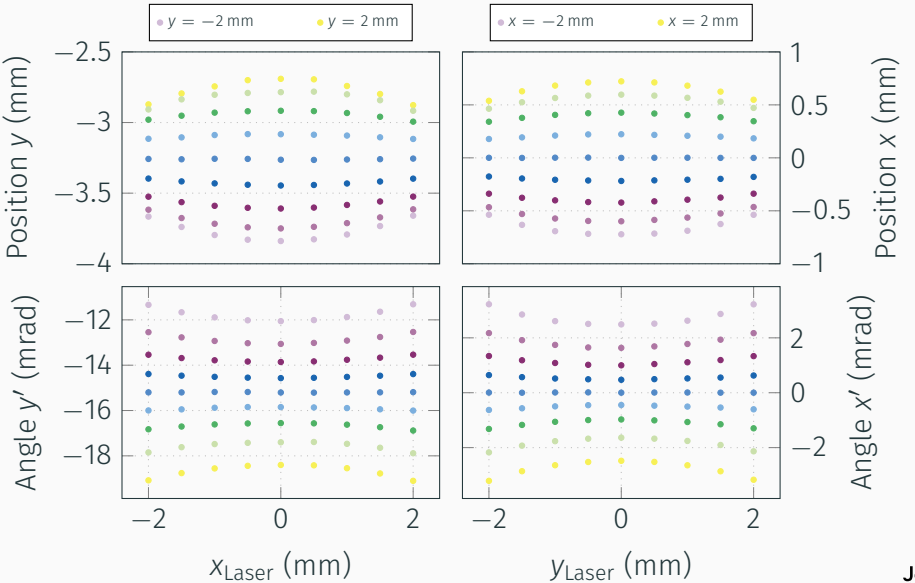
- Angle and displacement are independent
- Correctors needed
  (beam doesn't make it to second BPM)
- Understand fiducials in S&A data
- BPM calibration
- Laser stage calibration
  - both factor and offset:
    cathode center unknown
  - gun field couples x/y,
    so both planes affected



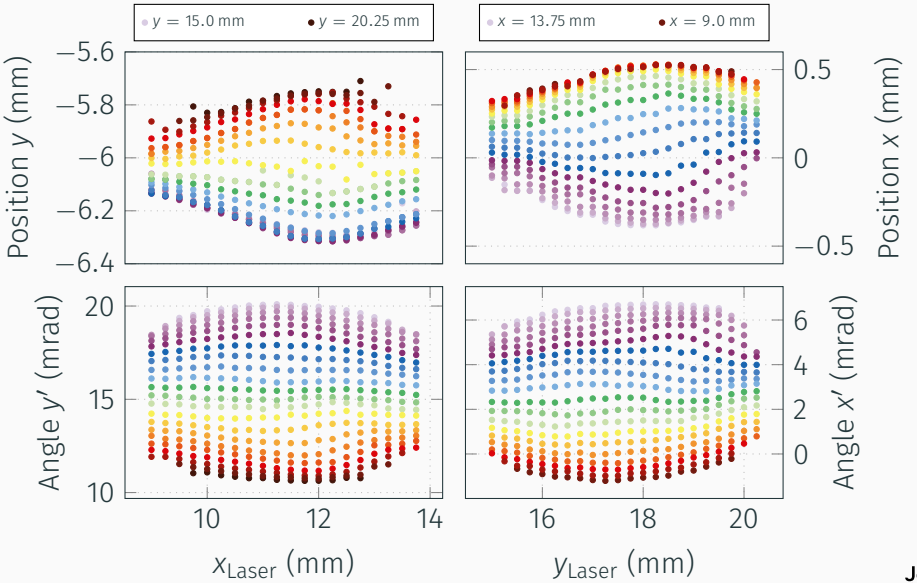
GPT centroid trajectories; $U = 130$ kV



GPT (x, x', y, y') at first BPM as a function of laser spot position; $U = 130$ kV



Measured (x, x', y, y') at first BPM as a function of laser spot position; $U = 130$ kV



Jefferson Lab

To do

- This may calibrate the origin of the laser stage...
- Include correctors in absolute angles
  - Correctors overlap with BPMs
  - Orbit from gun almost independent of voltage: varied voltage to measure dispersion
- Include calibration data
  - BPMs
  - mechanical alignment
  - laser stage
- Mystery: can't explain qualitative discrepancy