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AWAKE

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main parameters of the 18 MeV electron line for Run2c

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A Few (of my) Points

- Seeding with e-bunch demonstrated at low plasma density: $1x10^{14}cm^{-3}$
  - Acceleration "optimum" at $7x10^{14}cm^{-3}$ (i.e., may require smaller transverse size, more accuracy, lower jitter)
- Seeding for Q>150pC
  - "No trajectory reading" at lower charge
  - Bunch duration largely unknown (can be measured now)

- Beam shape looks regular at BTV354, not at ExpVol
- Large variations in beam spot shape (observed)
- Significant variations in position and angle (observed)
- Beam vector (angle) difficult to determine (short beta function <1m?)
- Other variations?

- Strong transverse evolution in the plasma

- Mostly unable to determine bunch parameters for seeding experiments
- But it seeds (at low density)
- "Less blind" experiments to be performed at higher density

Some Requirements

- Need diagnostics on p^+ bunch event (ML or others)
- Parameters to be measured:
  - Position at plasma entrance
  - Angle at plasma entrance
  - Charge (BCT?)
- Parameters (not measured?) that need to be consistent:
  - Transverse shape (true waist?)
  - Duration
  - Emittance
  - Energy spread (for other parameters)
  - Dispersion zero at plasma entrance
- Some parameters:
  - Transverse size at waist, at plasma entrance <200µm
  - Q>150pC(?)
  - Duration <2ps (for $7x10^{14}cm^{-3}$)
  - Low jitter, variations, etc.

- Need iteration between what is “possible” from a beam line and what is “necessary” for the seeding
- Determine, allow for flexibility in parameters
- Run 2c seeding is NOT supposed to be THE experiment