Beam energy can be lower sv, d, i
- Next step -
additionally requires total beam velocity
= (m/e) (Ions (1+))
Primary
Secondary
δ
φ
ψ
θ
- K.E. d = K.E.i + e
φ
ψ
φ
ψ

\( r \tan(i) + 2 \)
\[ \phi \]
\[ \psi \]

- Low
A)
T
\( - \) Toroidal 
(\( \phi \) tan(\( \phi \)))
Primary
POLOIDAL MAGNETIC FLUX 
P
ψ
δ
φ

\( \psi \rightarrow i \)

- K.E. = \( \psi \)

- Localized to ionization volume
In core,
is
\( \psi \rightarrow i \)

\( i \)

- Safety factor
Current density

- Typically 2 + for 1+ primary
Inject primary beam

- Variation of potential and bead
Primary
Secondary

- Measurement

\( \sim 4 \)
Interpolate between background measurements

\( \psi \rightarrow \phi \)

\( \theta \)

\( \phi \)

- Fluctuations from experiment
MHD Fluctuations

\( \psi \rightarrow \phi \)

\( \theta \)

- Validation of equilibrium and MHD theory
Fluctuation measurements

\( \theta \)

\( \phi \)

\( \psi \rightarrow \phi \)

\( \theta \)

- Scrape-off signals negligible for traditional HIBP
Low energy - larger ionization cross-section
- Alternate geometry
- Short distance to detector
Change with time - qualitative agreement with expectation
- Measurement of secondary
- Simulation and measurement agree in low-noise experiment

- Permanent magnets to stop plasma particles
Comparison with MSTFit - equilibrium validation
Different equilibria

- MST tearing modes
- Electronic noise
Possible approaches
Array detector

- FUTURE WORK - \( \phi \)

\( \theta \)

\( \phi \)

\( \psi \rightarrow \phi \)

\( \theta \)

- Program in developing \( \phi \)
Program technical
- Retro cost, grateful, single beam diagnosis
- Radiocation by a 100% direct view detector
- Future sensitivity: 30 cm beam line
- Magnetic plasma, on beam plasma
- External plasma, target plasma

- \( \phi \)

\( \theta \)

\( \phi \)

\( \psi \rightarrow \phi \)

\( \theta \)

- Summary

\( \phi \)

\( \theta \)

\( \phi \)

\( \psi \rightarrow \phi \)

\( \theta \)

- Photoemission from detector or housing
- Surface treatment / material properties
- Reduced UV photo-emitted electron noise

- Can have cross-sections

- Measurement linearly increase to \( \sim 10 \) xneider
- Interpolate between background measurements

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\( \theta \)

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