Simulation Status of Mercury Jet Target

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B Field Map and Jet Distortion (1)

Pulsed Solenoid Magnetic Field (15T)

Magnetic Field Along Hg Jet Axis

- Magnetic field direction (degrees)
- Transverse magnetic field (T)
- Longitudinal magnetic field (T)
Distortion ratio

\[ \varepsilon(z) = \frac{\kappa}{2\nu \rho} \iint B_y \frac{\partial B_y}{\partial z} dz \]  

J. Gallardo et al., BNL, 2002

Propose to simulate 15m/s jet velocity with surface tension
Hg Jet Projectile, 20m/s, 67mrad, 1.2cm offset
Hg Jet Projectile, 15m/s, 67mrad, 1.2cm offset
Energy Deposition By Beam On Hg Target

$E = 14 \text{ GeV/c}, B = 0 \text{ T}, \text{Target angle 33 mrad, Beam angle 67 mrad}$

Energy deposition density on mercury target, $B=0\text{T}$

Energy deposition in mercury target at 14 GeV/c, 15 T.

Sergei Striganov, Fermilab, Jan. 2008
Energy Deposition By Beam On Hg Target

E = 14 GeV/c, B = 15 T, Target angle 33 mrad, Beam angle 67 mrad

Propose to simulate 3D model for the case of 14GeV/c, 24GeV/c with 0T~15T field.

Sergei Striganov, Fermilab, Jan. 2008
Aspect Ratio of Jet

- Jet distortion (aspect ratio) strongly depends on the angle with the solenoid axes (it increases at larger angles).
- Jet aspect ratio increases at smaller jet velocities (at least if the change of velocity is small compared to the reference velocity of 25 m/s).

\[
\frac{R_{\text{max}}}{R_0} = 1.35 \quad \text{at} \quad V = 25 \text{ m/s, alpha} = 100 \text{ mrad, B = 15 T}
\]

\[
\frac{R_{\text{max}}}{R_0} = 1.09 \quad \text{at} \quad V = 25 \text{ m/s, alpha} = 50 \text{ mrad, B = 15 T}
\]

Propose to simulate 15m/s jet velocity for the case of 0T~15T field.

Roman Samulyak, BNL, 2005-2007
Propose to simulate cavitation model for the case of beam energy 14GeV/c, 24GeV/c with 0T~15T field.

Roman Samulyak, BNL, 2005-2007