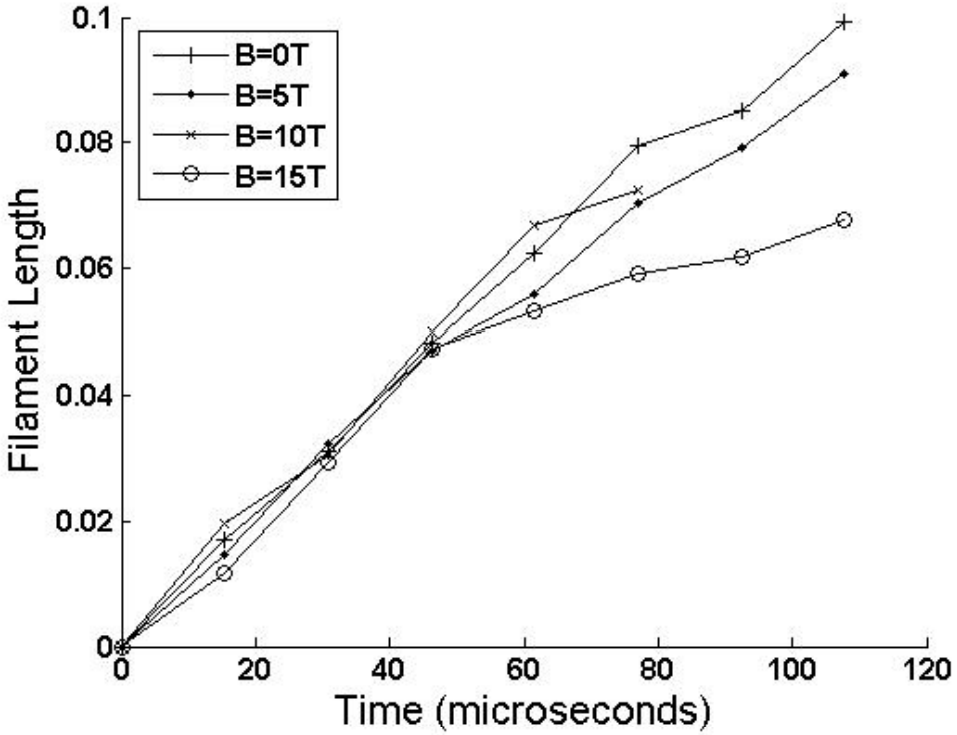
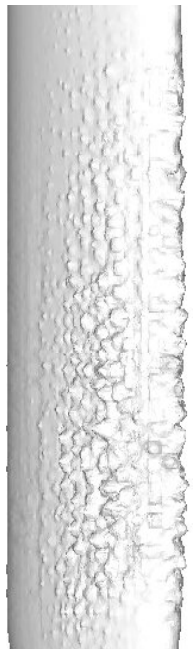
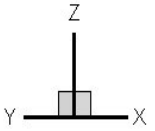
3D Simulations for the Elliptic Jet W. Bo (Aug 12, 2009)

- Parameters: Length = 8cm
  - Elliptic jet: Major radius = 0.8cm, Minor radius = 0.3cm
- Striganov's Energy deposition calculation for 14Gev, 10Tp proton beam is used. The peak pressure is 14,000 bar.

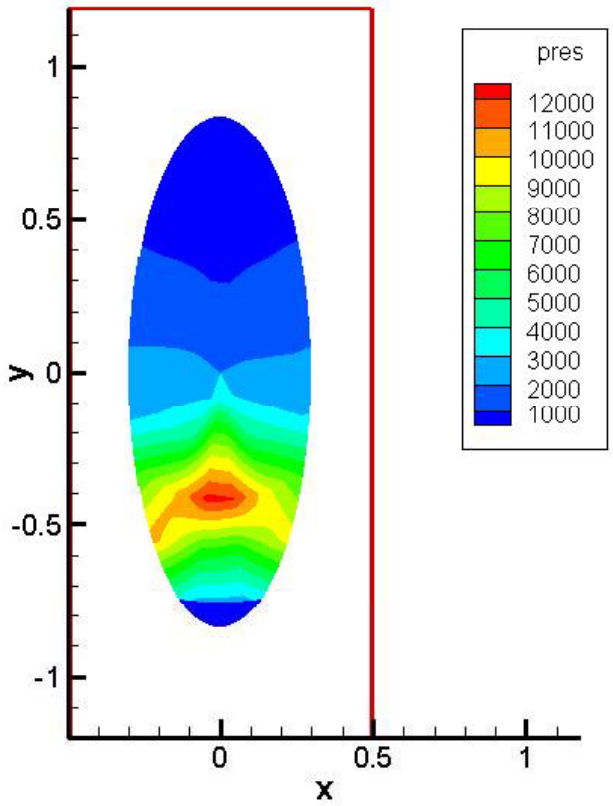




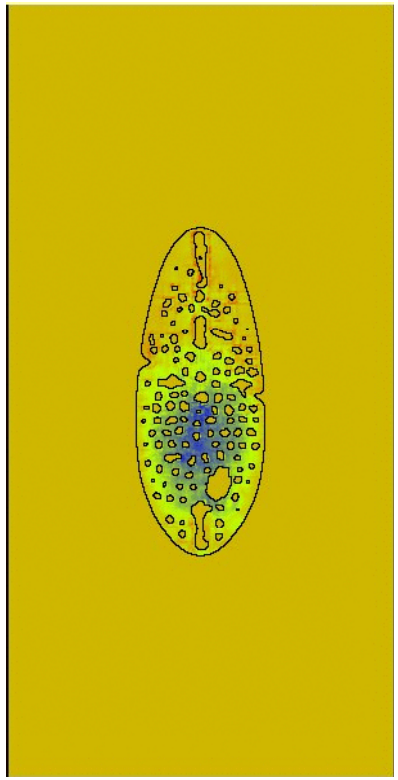


2D Simulations for the Elliptic Jet

- Parameters are the same as those in the 3D simulations.
- A cross section of the jet is simulated.
- The phase transition on cavitation bubbles are modeled.



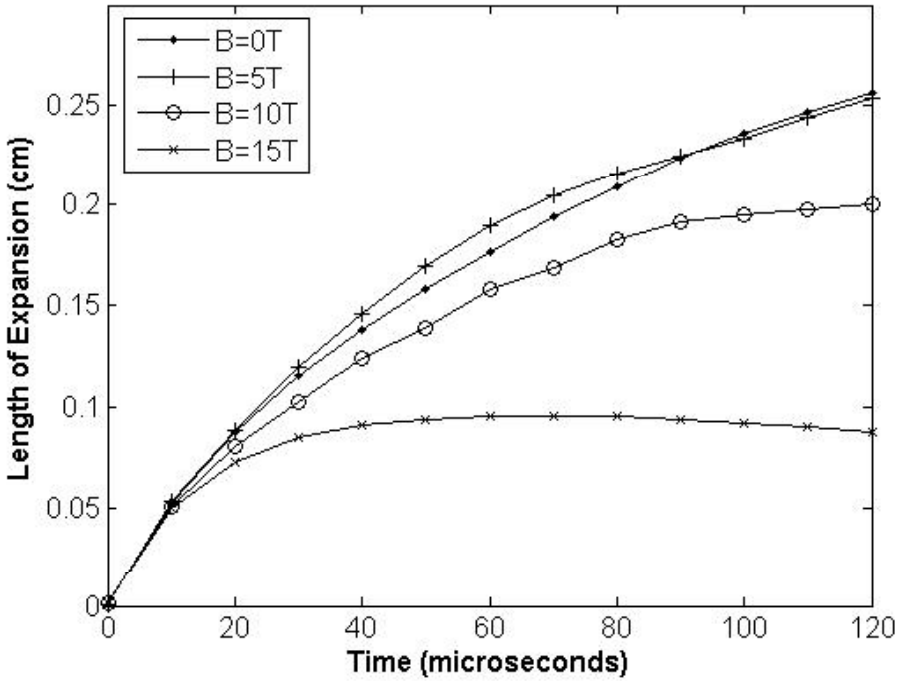
Initial pressure distribution

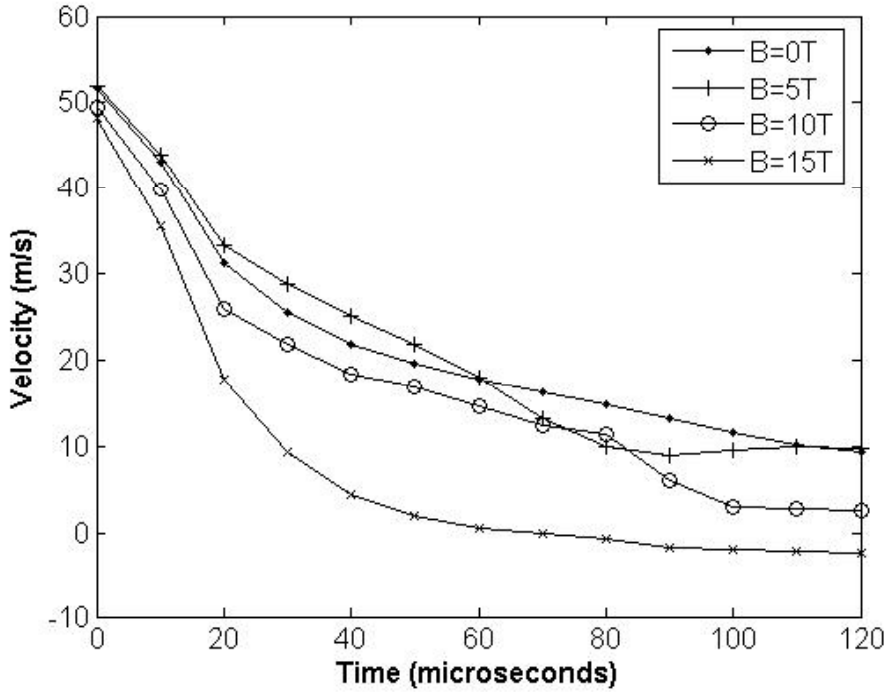


Pressure field for B=5T

Expansion of the Jet in 2D Simulations

- The length of (radial) expansion and the velocity of that expansion





Conclusions

- 3D simulations give small jet expansion velocity of filaments (at 14 GeV and 10 Tp). When B=0T and 5T, the expansion velocity is 10 m/s. When B=10T and 15T, the expansion velocity is 8m/s.
- 2D simulations give similar jet expansion velocity at late time. But filaments on the surface are not observed. The magnetic field has stronger effect due to the circular current in the jet. The jet stops expansion when B=15T.