2D Turbulent Mercury Jet

Yan Zhan

SUNY Stony Brook

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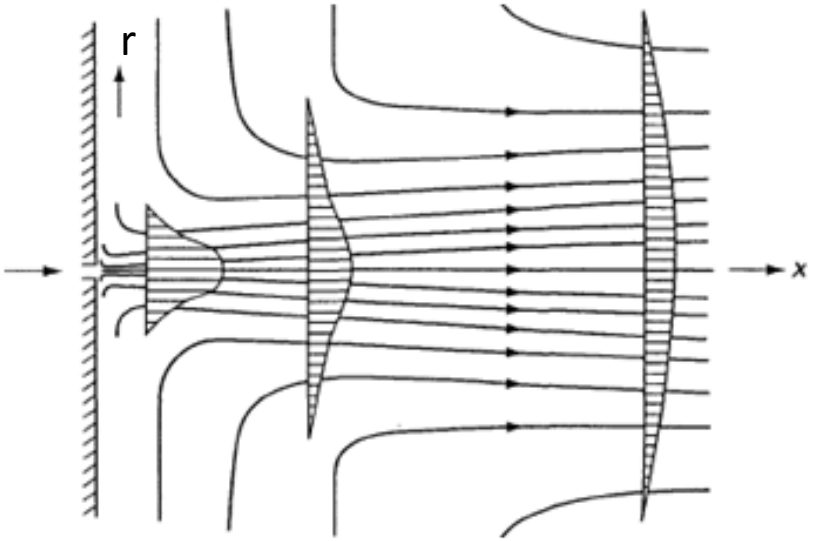
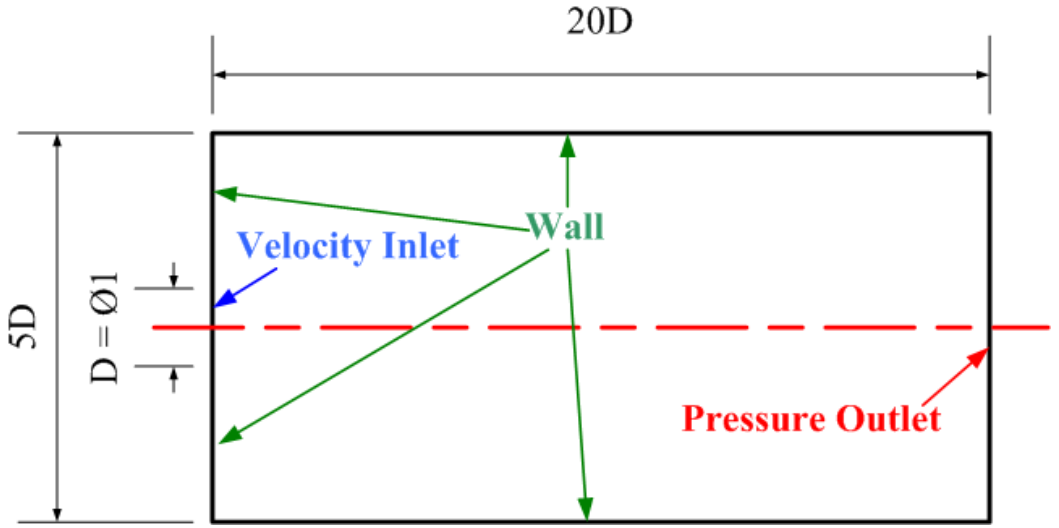
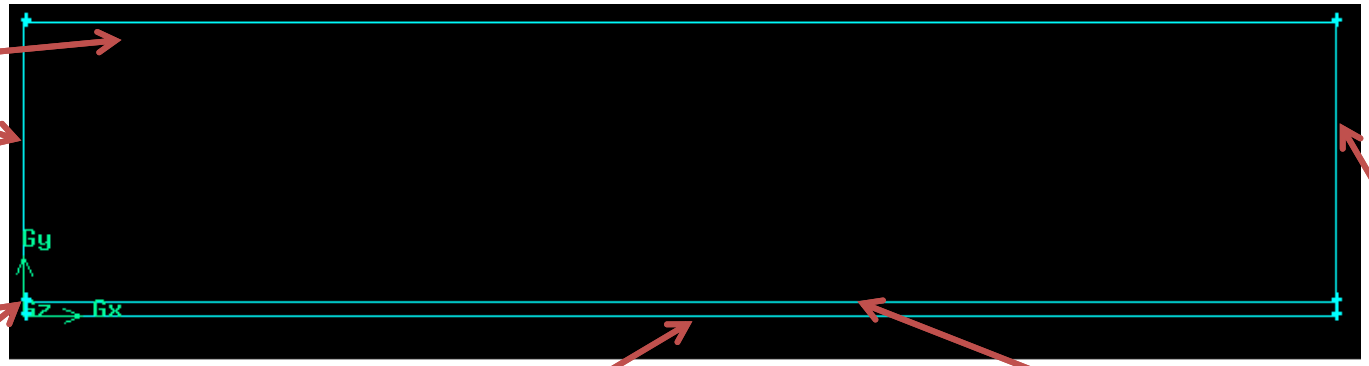
Problem1


r
x


20D
5D
D = Ø1
Velocity Inlet
Wall
Pressure Outlet


Wall
Pressure outlet
Inlet velocity
Axial symmetric
Interior

Problem1 -Jet Characteristics

- Physical Characteristics

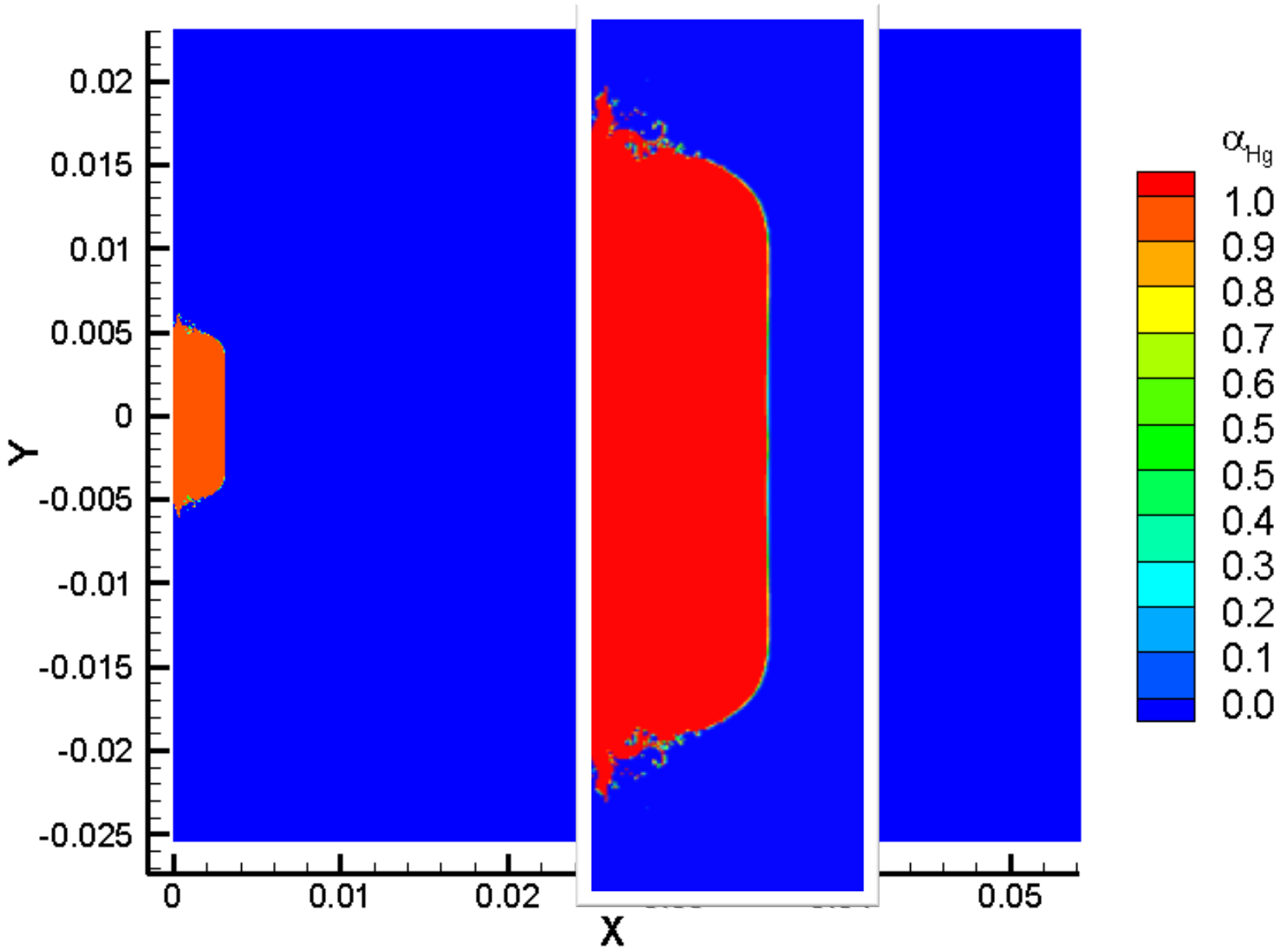
Diameter (D)	Velocity	Turbulent Intensity	Length Scale
0.0102108 m	20 m/s	u‘/U = 0.05	0.1D
Phase	Density	Viscosity	Surface Tension
Air	1.225	1.460735 m^2/s	
Mercury	13456 kg/m^3	1.1147×10^{-7} m^2/s	0.4855 N/m

- Numerical Characteristics
  - Determination of the mesh size:

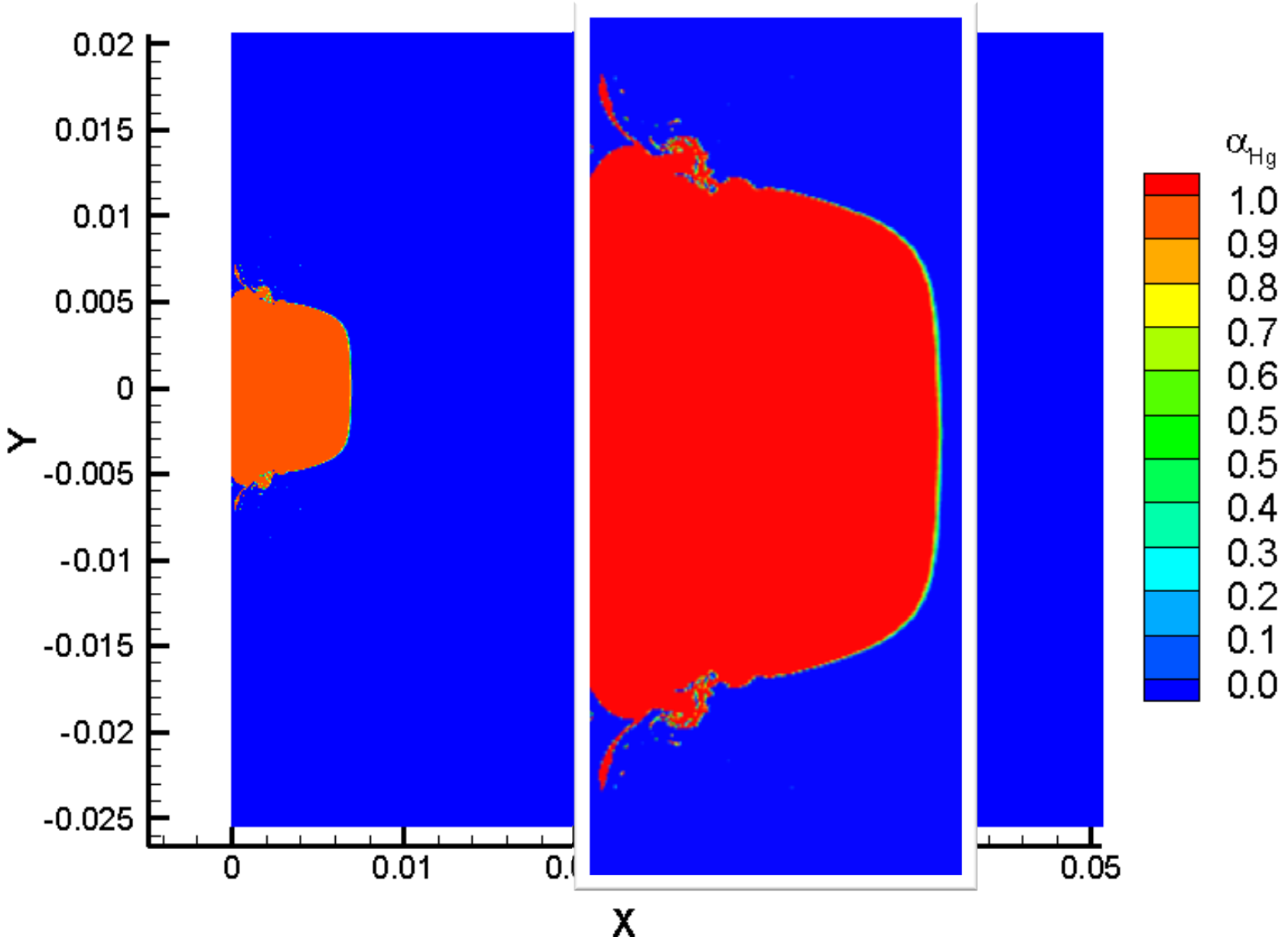
Assume only primary breakup, the critical liquid Weber number is less than 10, then $\Delta x < 0.89$ μm (mercury)

$$We \equiv \frac{\rho u^2 l}{\sigma}$$

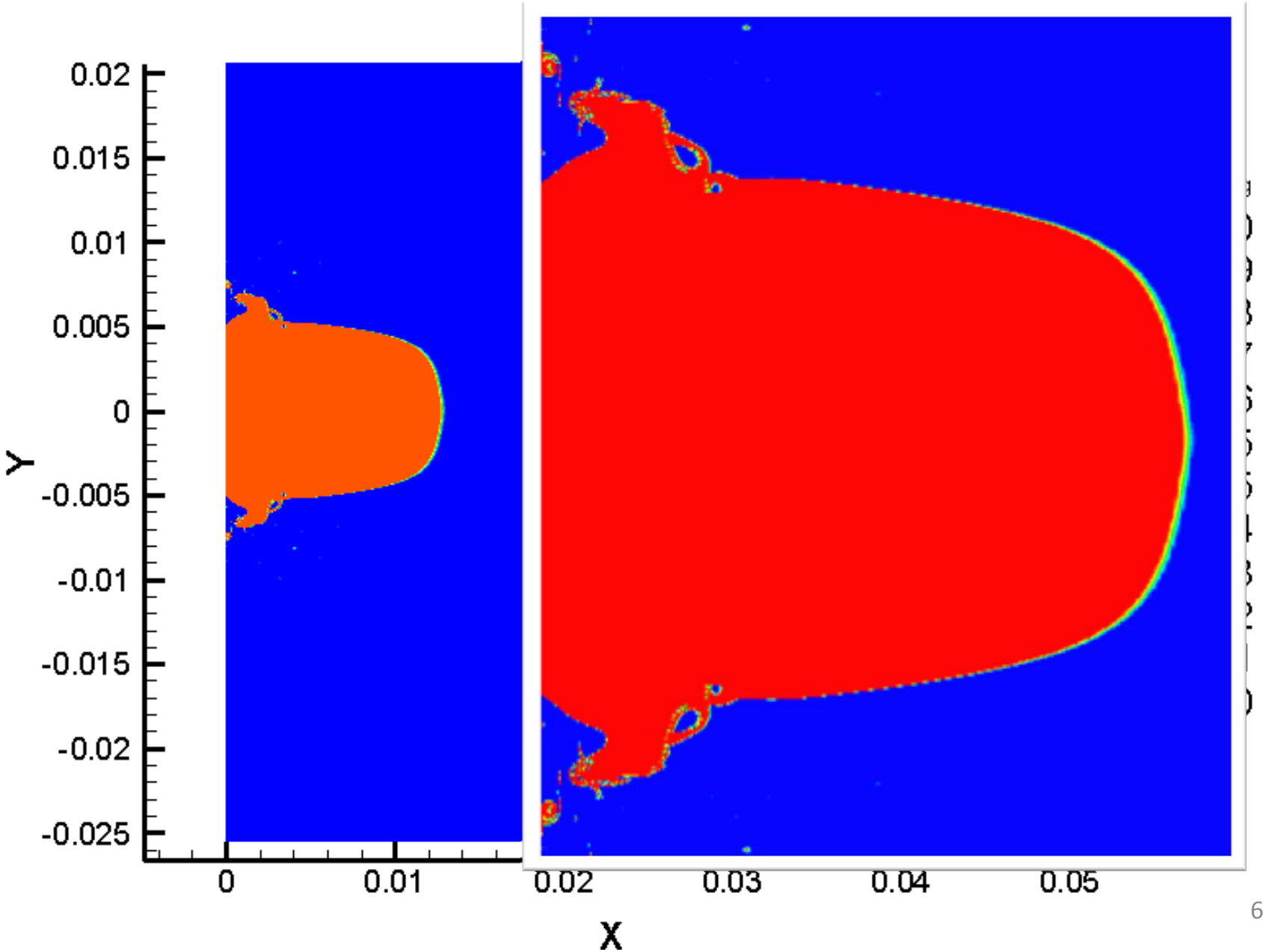
Results __ t = 0.15ms



Results __ t = 0.35ms



Results __ t = 0.6ms



Results __ t = 0.8ms