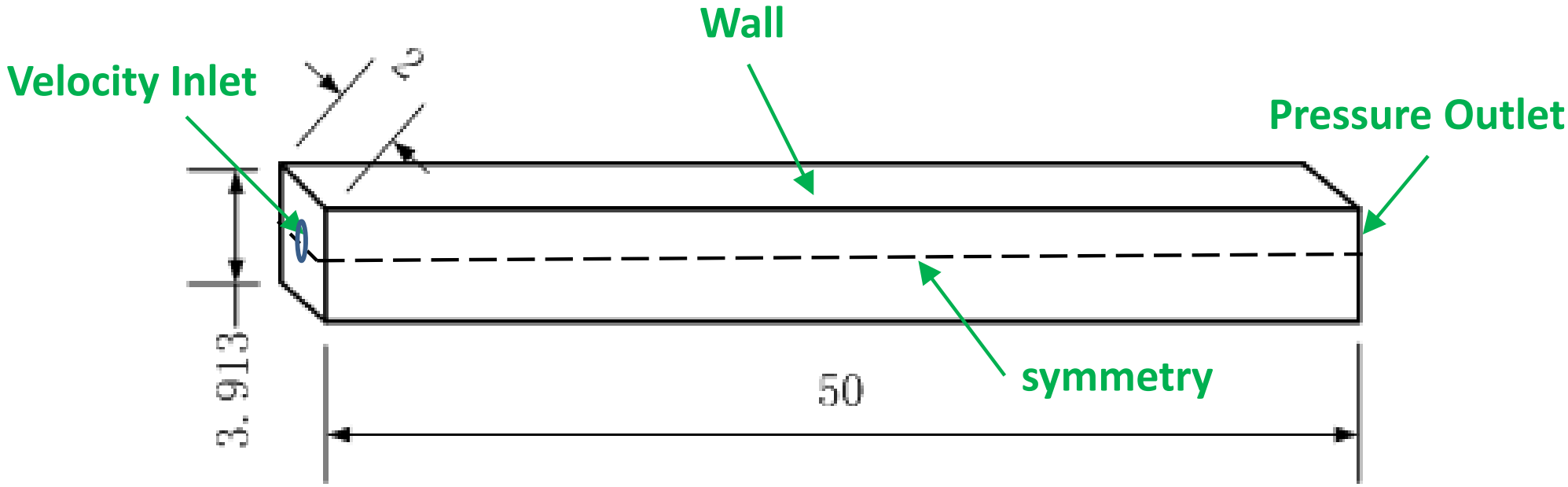
3 Dimensional Hg Jet Simulation

Yan Zhan

May 9th 2014

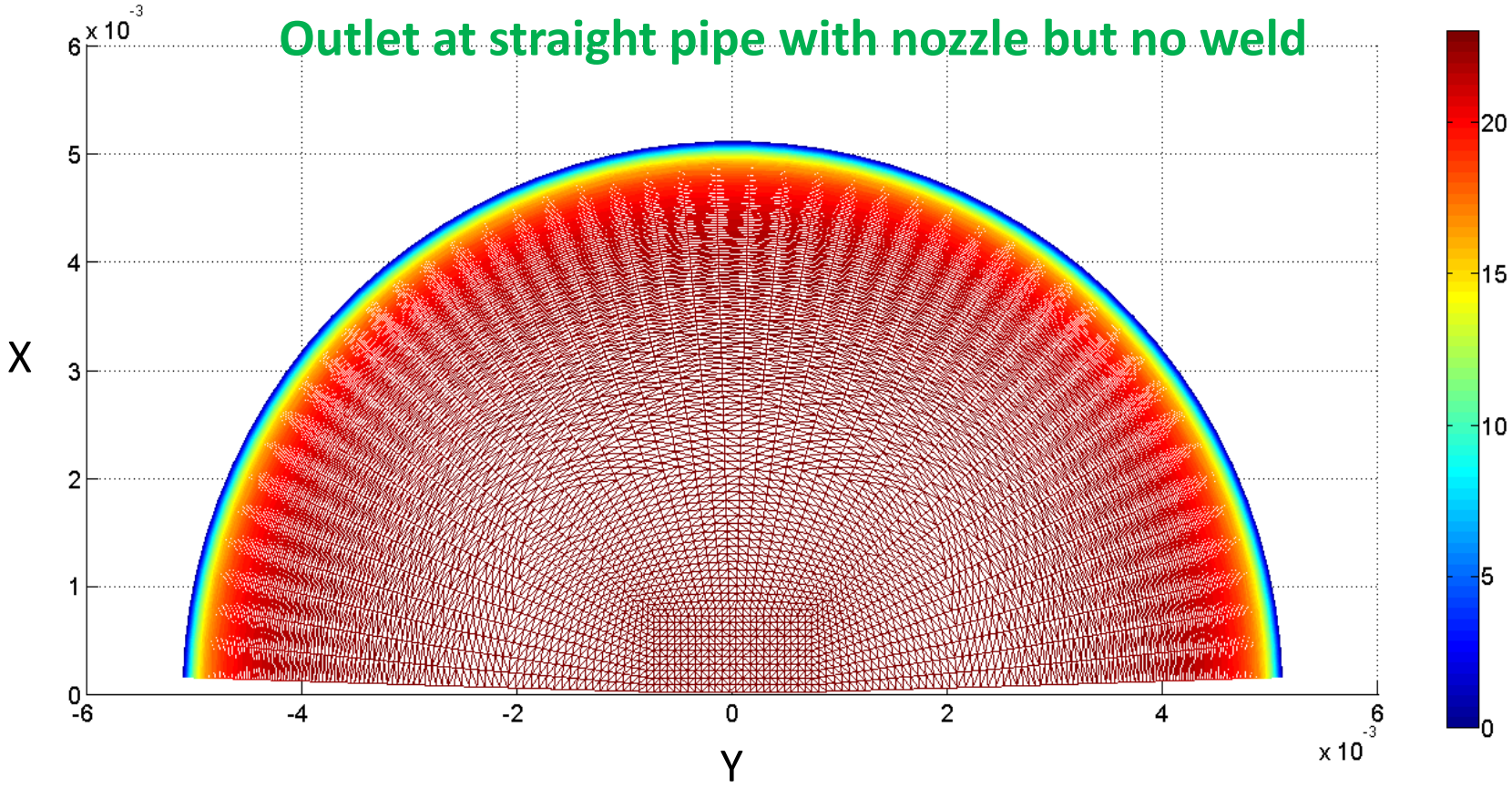
Boundary Conditions



X axis is in the long (3.9 unit) direction
Y axis is in the short (2 unit) direction = bend plane
Z axis is in the very long (50 unit direction = direction of jet
No gravity in the model.

Units on this slide are in jet diameters

Axial Velocity Contour At The Jet Inlet

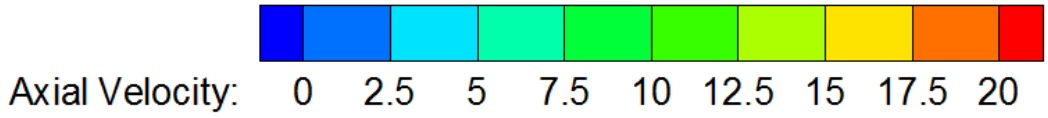


u = **U** + sqrt(2**k**/3), where **k** = ½((u')^2+(v')^2+(w')^2)

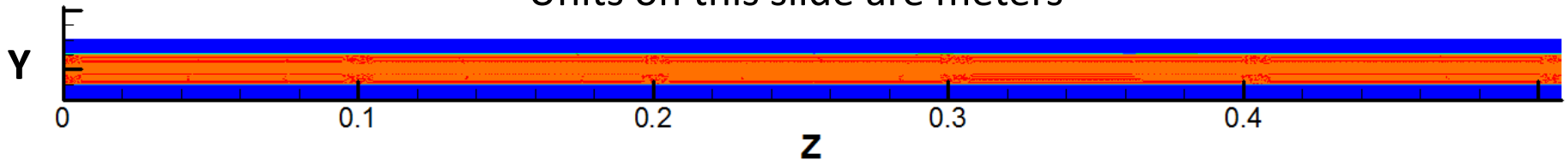
pipe simulation

Units on this slide are meters

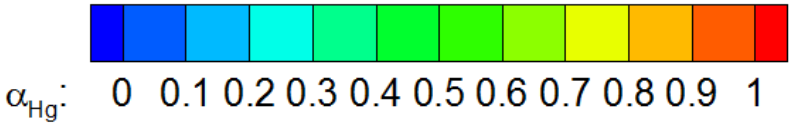
Initial Condition At X=0

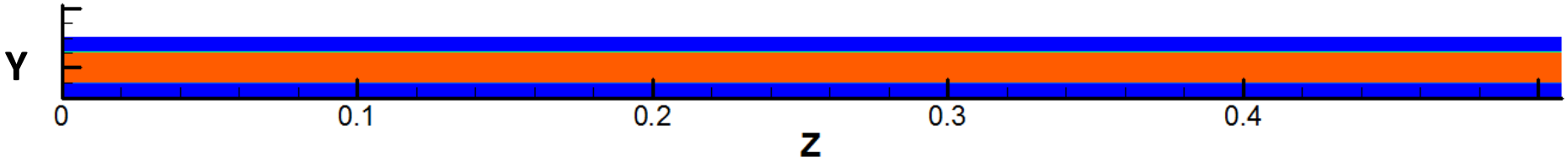


Units on this slide are meters



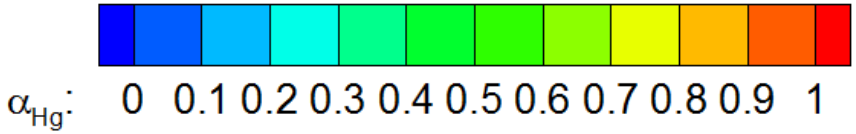
At t = 0, v = 20 m/s for all z > 0 and r < 0.5 cm, but the velocity at z = 0 is taken from slide 3.

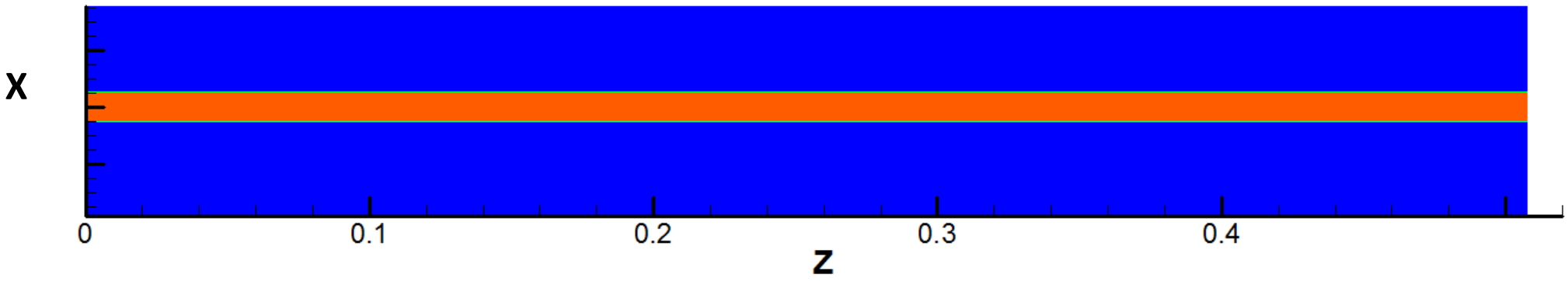


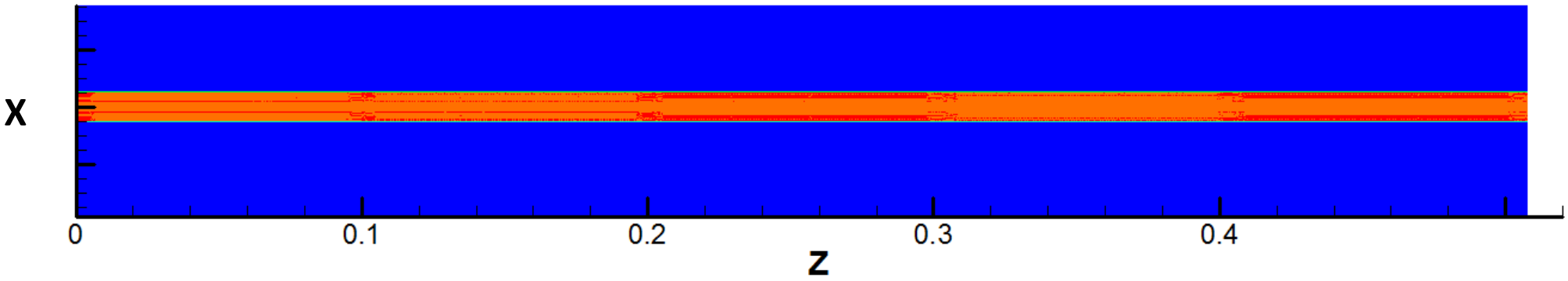


At t > 0 fluid enters the left boundary (= inlet), always with the parameters of slide 3,
$\Rightarrow$ no time dependence to inlet flow, $\Rightarrow$ inlet flow is effectively laminar.

Initial Condition At Y=0

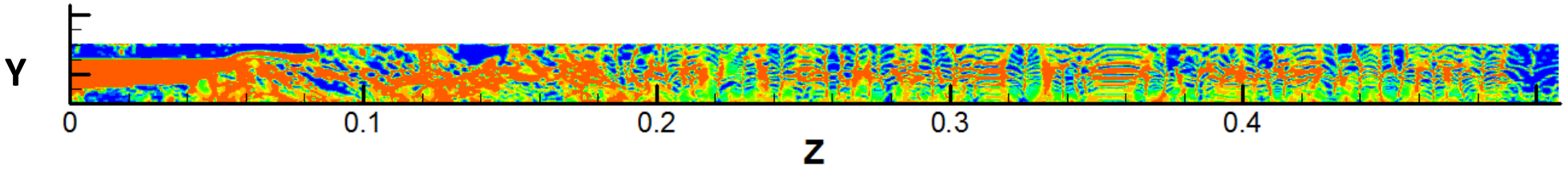




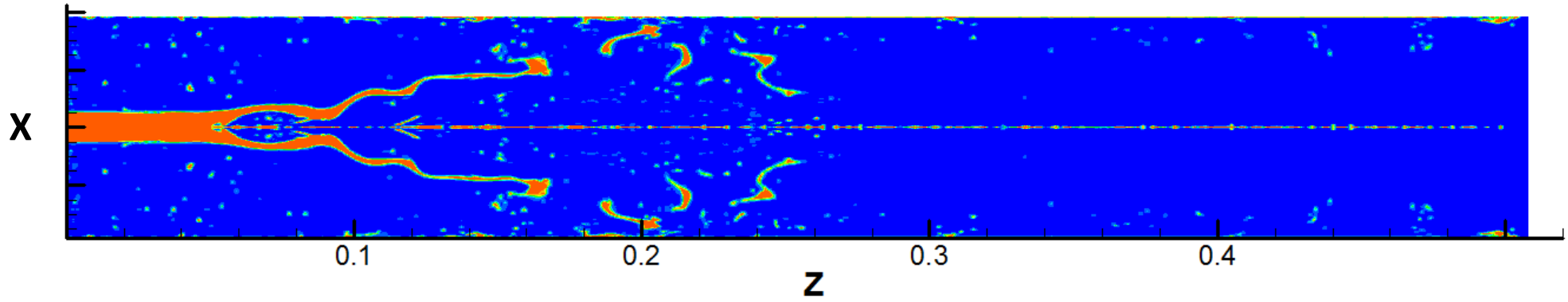


Units on this slide are meters

Results at t = 14ms



At plane X=0



At plane Y=0

Units on this slide are meters

Five Inlet Conditions For 3D Jet Simulation

Case #	Half Bend Angle (deg)	Nozzle	Weld	Complete?
1	0	Yes	No	Yes
2	90	Yes	No	Yes
3	90	Yes	Whole weld	Yes
4	90	Yes	Partial weld out of the bend plane	Yes
5	90	Yes	Partial weld in the bend plane	No (about two weeks)

Mesh For New Case Of Partial Weld