3D Hg Jet Simulations

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Outline

- 3D Hg Jet Simulations (~ 100 ms each = 4 flow-thru times)

Case #	Inlet Conditions
1	Outlet conditions of 0° bend pipe without a weld
2	Outlet conditions of 90°/90° bend pipe without a weld
3	Outlet conditions of 90°/90° bend pipe with a 30° weld

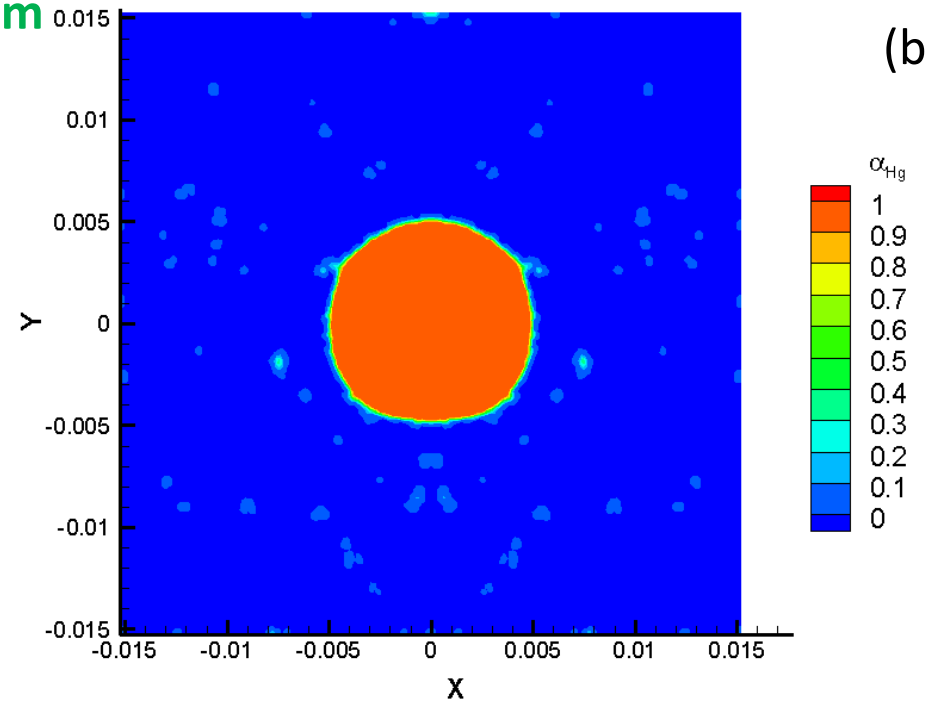
Cases 1 and 2 were half models, symmetric about the x-axis.

- Ellipse Fitting

3D Hg Jet Simulations_Case 1

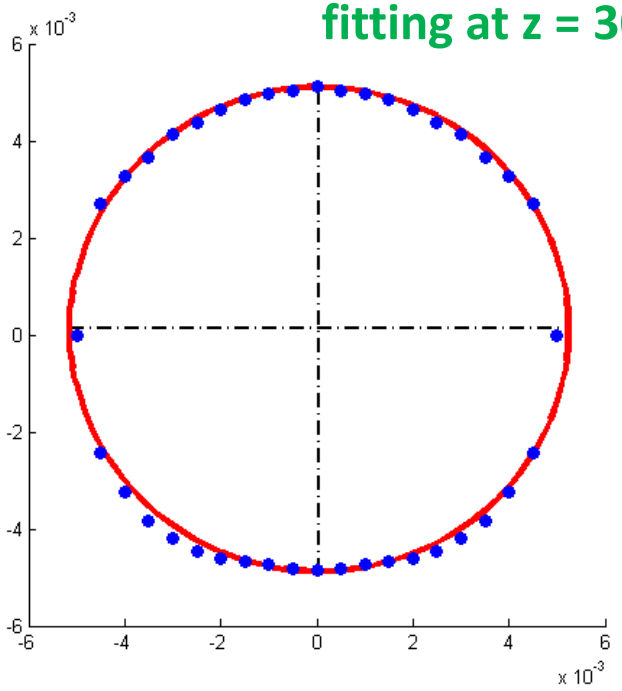
α_{Hg} at z = 30 cm

(a)



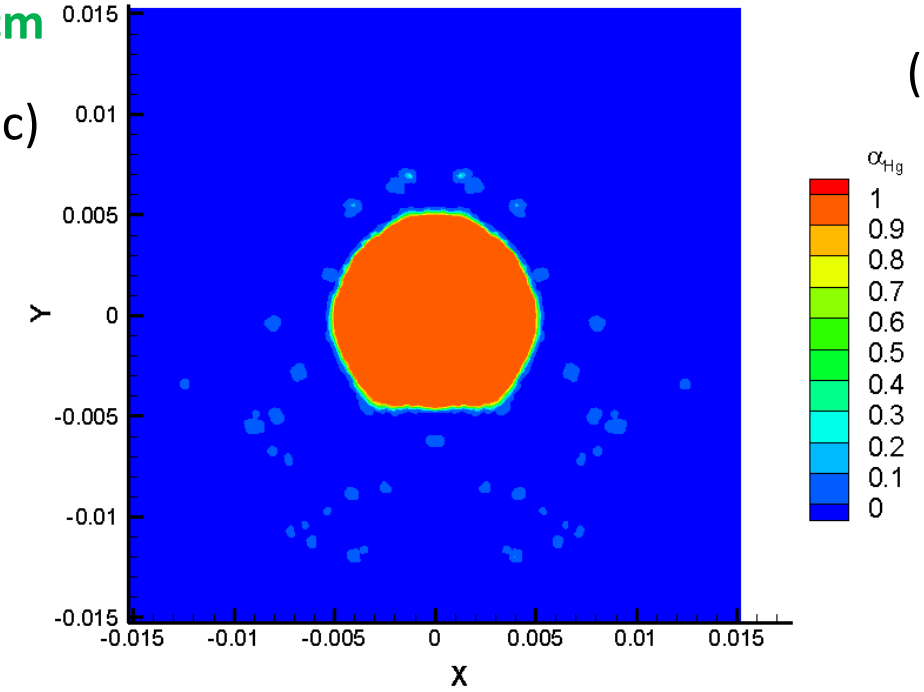
(b)

fitting at z = 30 cm



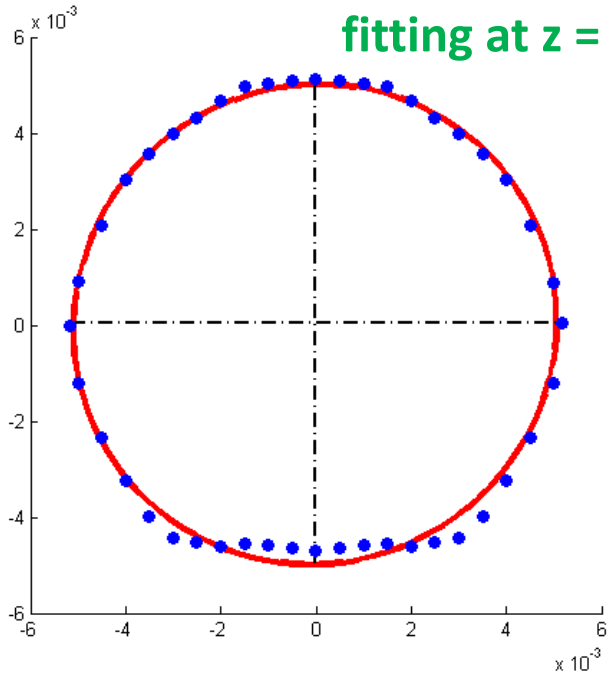
α_{Hg} at z = 45 cm

(c)



(d)

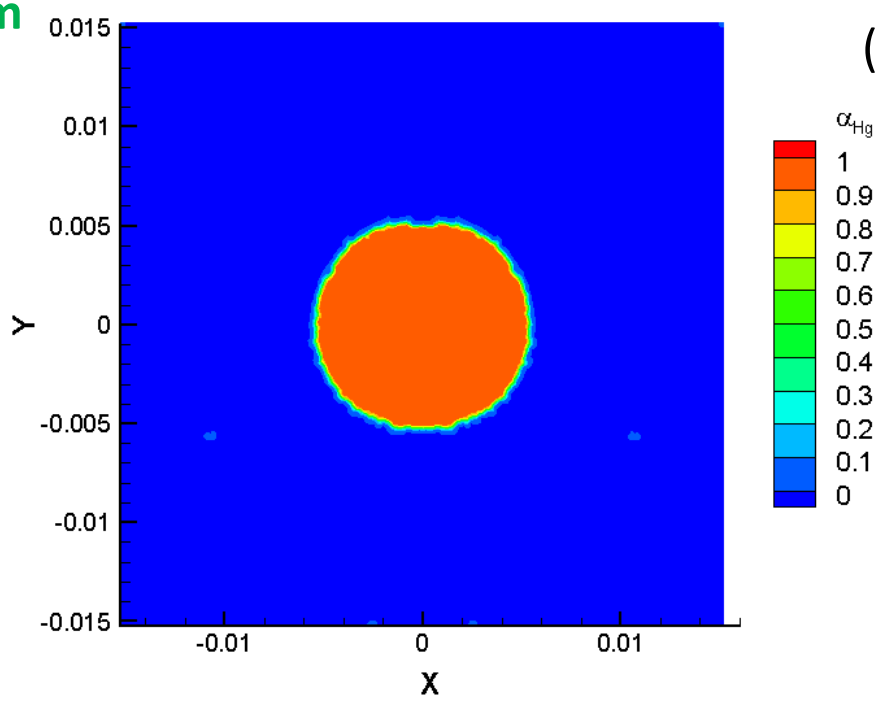
fitting at z = 45 cm



3D Hg Jet Simulations_Case 2

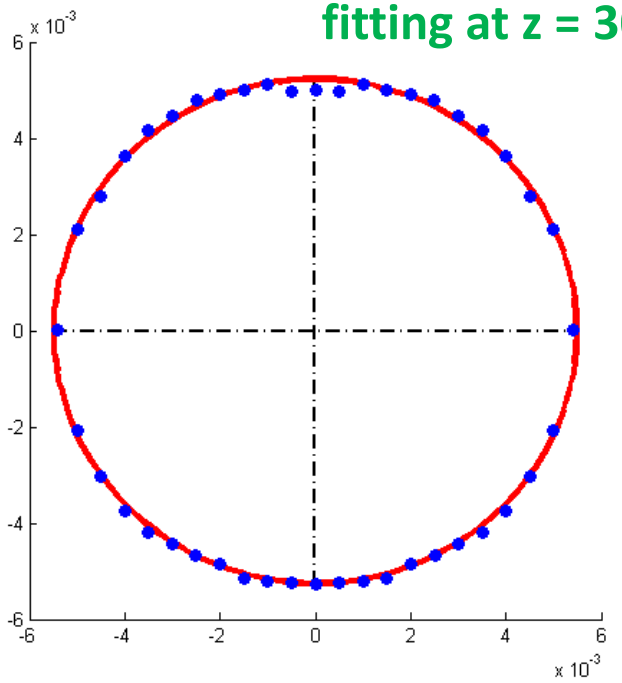
α_{Hg} at z = 30 cm

(a)



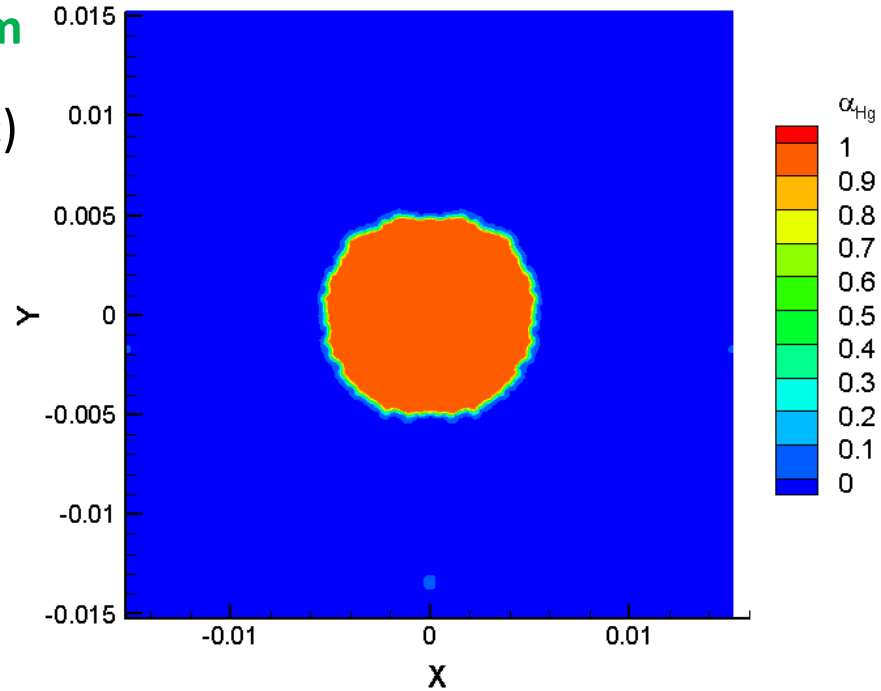
(b)

fitting at z = 30 cm



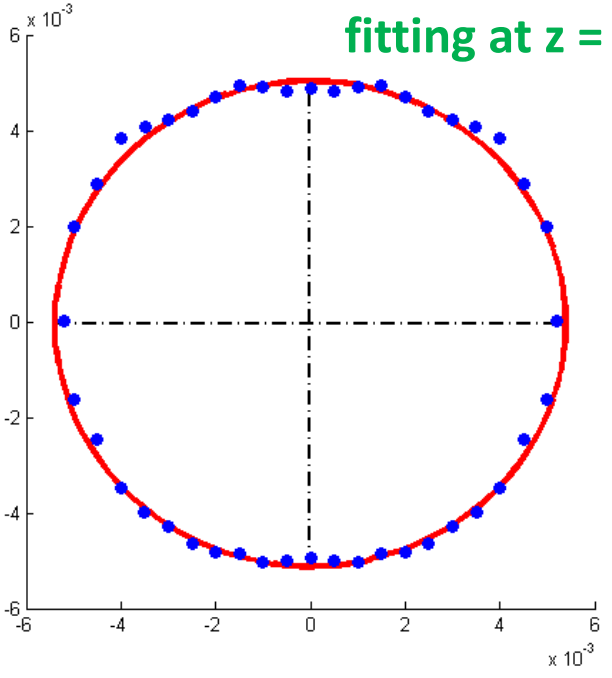
α_{Hg} at z = 45 cm

(c)



(d)

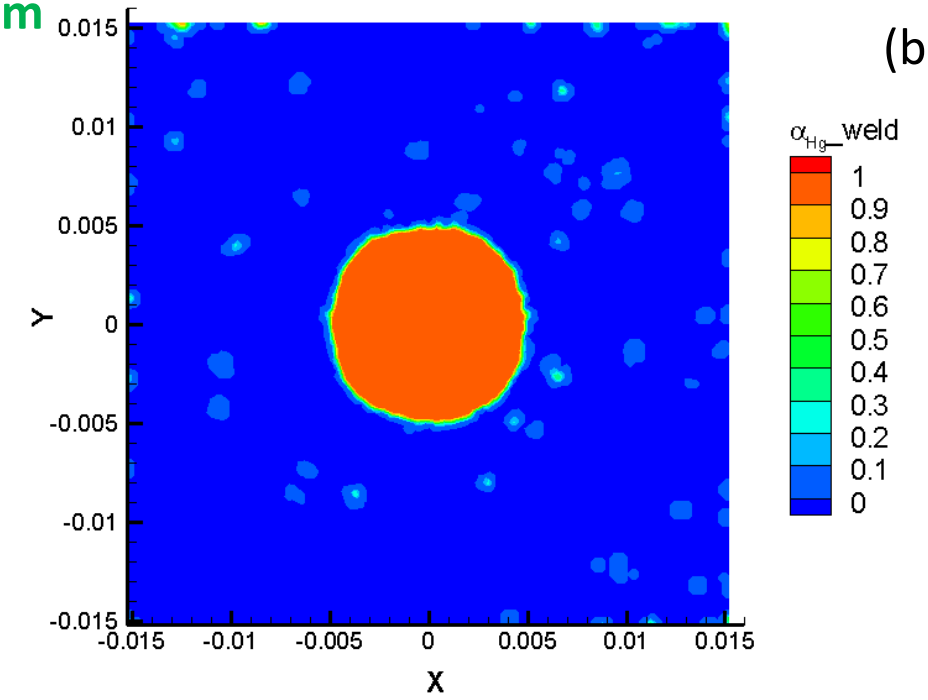
fitting at z = 45 cm



3D Hg Jet Simulations_Case 3

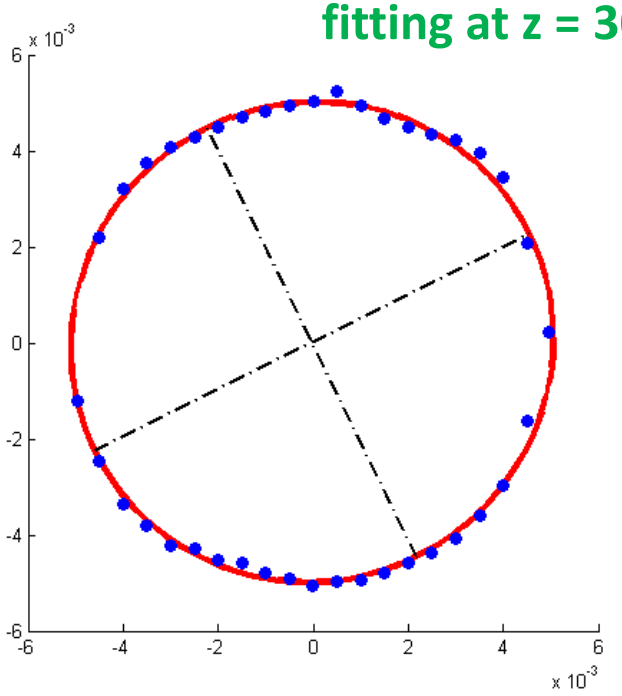
α_{Hg} at z = 30 cm

(a)



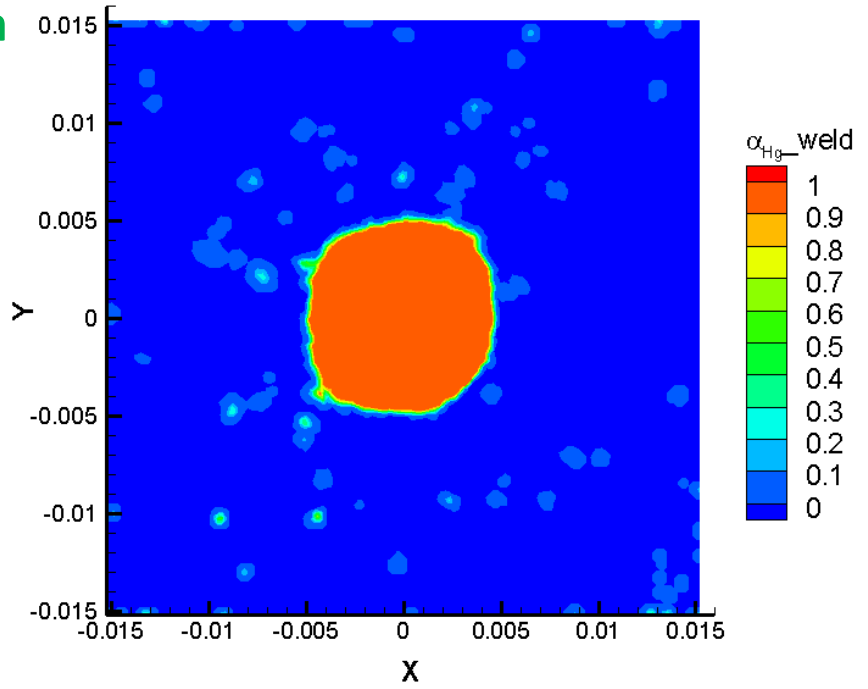
(b)

fitting at z = 30 cm



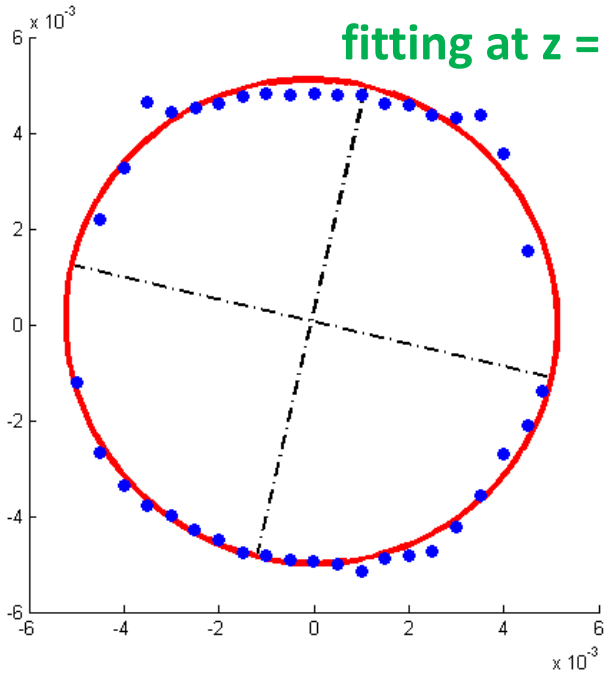
α_{Hg} at z = 45 cm

(c)



(d)

fitting at z = 45 cm



Ellipse Fitting

	a	b	θ	x_c	y_c	ellipticity
Case 1 at z = 30 cm	0.0052	0.005	0°	-4.7583e-05	1.1963e-04	0.038462
Case 1 at z = 45 cm	0.0051	0.005	0°	-8.5702e-07	5.3878e-05	0.019608
Case 2 at z = 30 cm	0.0055	0.0053	0	-1.6004e-07	-5.3676e-06	0.036364
Case 2 at z = 45 cm	0.0054	0.0051	0°	-5.3034e-08	-3.685e-05	0.055556
Case 3 at z = 30 cm	0.0051	0.005	153.753°	-1.4746e-05	-2.8267e-05	0.019608
Case 3 at z = 45 cm	0.0052	0.005	13.167°	-6.2409e-05	5.6855e-05	0.03846

Note: (x_c,y_c) is the ellipse center,
Ellipticity = (major axis – minor axis) / major axis = (a – b) / a
The symmetry about the x-axis in cases 1 and 2 forces angle θ to be zero.