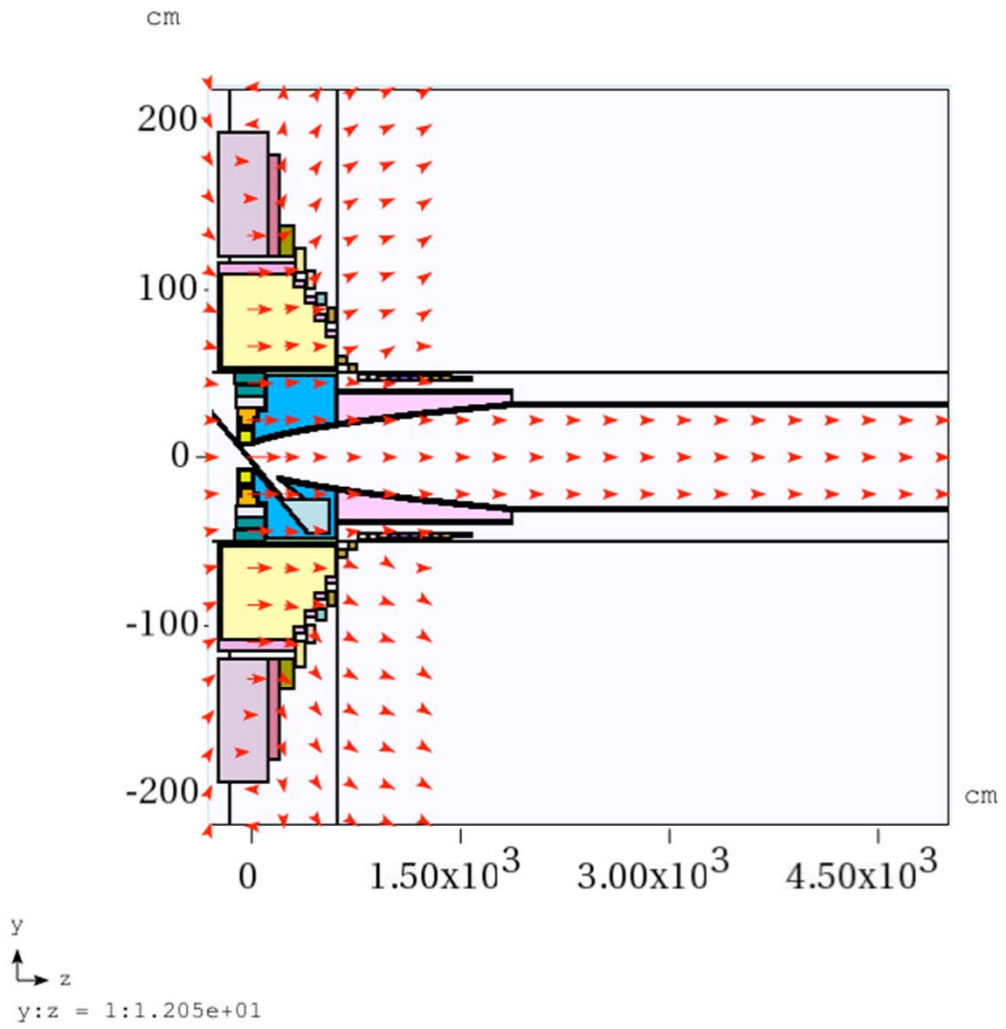
Meson Production at 8 GeV for IDS120h (Update)

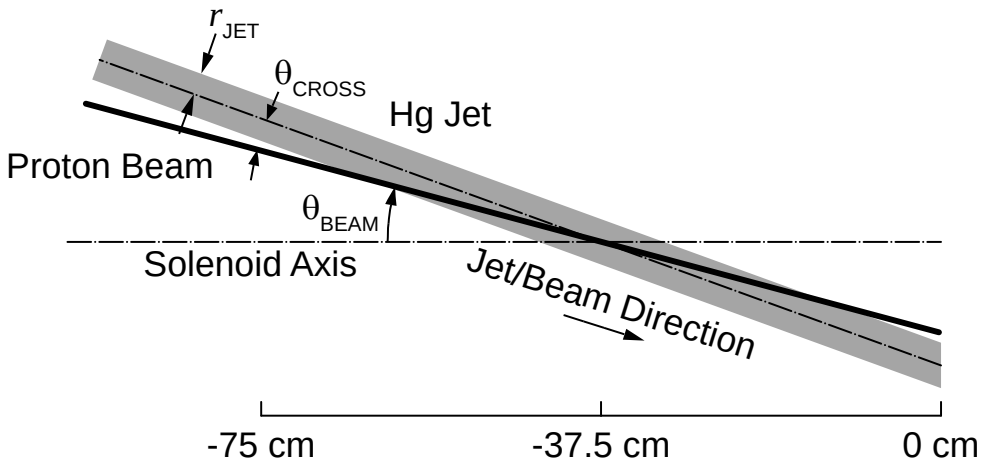
X. Ding, UCLA

Target Studies, Jan. 10, 2012

Configuration of IDS120h



Meson Production Study



The mercury jet target geometry. The proton beam and mercury jet cross at z=-37.5 cm.

1. IDS120h (Geometry and fieldmap) for HG/GA target
2. Beam below the HG/GA jet exactly at z=-37.5 cm and project beam back to z=-200cm.
3. Initial target parameters: target radius of 5 mm, beam angle of 67 mrad at z=-37.5 cm, beam/jet crossing angle of 33 mrad at z=-37.5 cm.
4. Optimized methods at each cycle (3 runs): 1) Vary jet radius; 2) Vary beam/jet crossing angle while keeping jet fixed - always project beam back to z=-200 cm; 3) Vary jet angle-always keep crossing angle constant-both jet and beam must be rotated about intersection point together and always project beam back to z=-200 cm.

Optimized Target Parameters at z = -37.5 cm

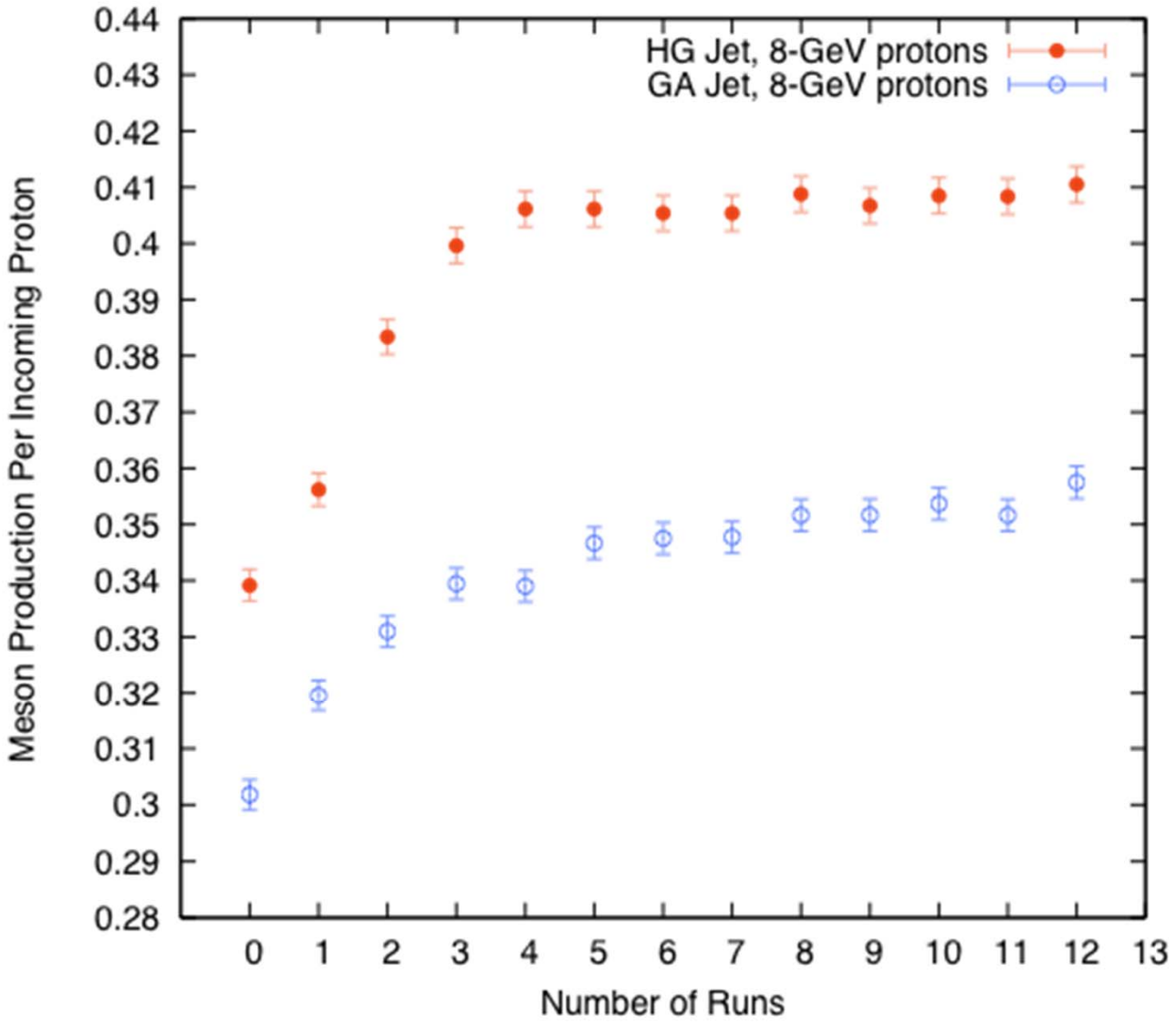
	HG			GA		
	Target radius, mm	Crossing angle, mrad	Beam angle, mrad	Target radius, mm	Crossing angle, mrad	Beam angle, mrad
Initial	(5mm, 33mrad, 67mrad)			(5mm, 33mrad, 67mrad)		
1st Cycle	4.6	23	120	6.7	21	112
2nd Cycle	4.15	23	117	5.5	17	94
3rd Cycle	4.15	21.6	120	4.9	13.2	92
4th Cycle	4.04	20.6	117	4.5	13	90
5th Cycle				4.4	12.8	86

Meson Productions at 8 GeV (400,000 events)

	HG	GA
Before optimization (Target radius/beam angle/crossing angle)	108528 (5mm/67mrad/33mrad, Initial)	96586 (5mm/67mrad/33mrad, Initial)
After optimization (Target radius/beam angle/crossing angle)	131362 (4.04mm/117mrad/20.6mrad, end of 4th Cycle)	114401 (4.5mm/90mrad/13mrad, end of 4th Cycle)

Meson Productions Vs. Run No.

(Number of runs: 0-Initial, 1,4,7,10-optimized target radius, 2,5,8,11-optimized crossing angle, 3,6,9,12-optimized beam angle)



Focused Incident Proton Beam