DX Physics Aperture Measurement

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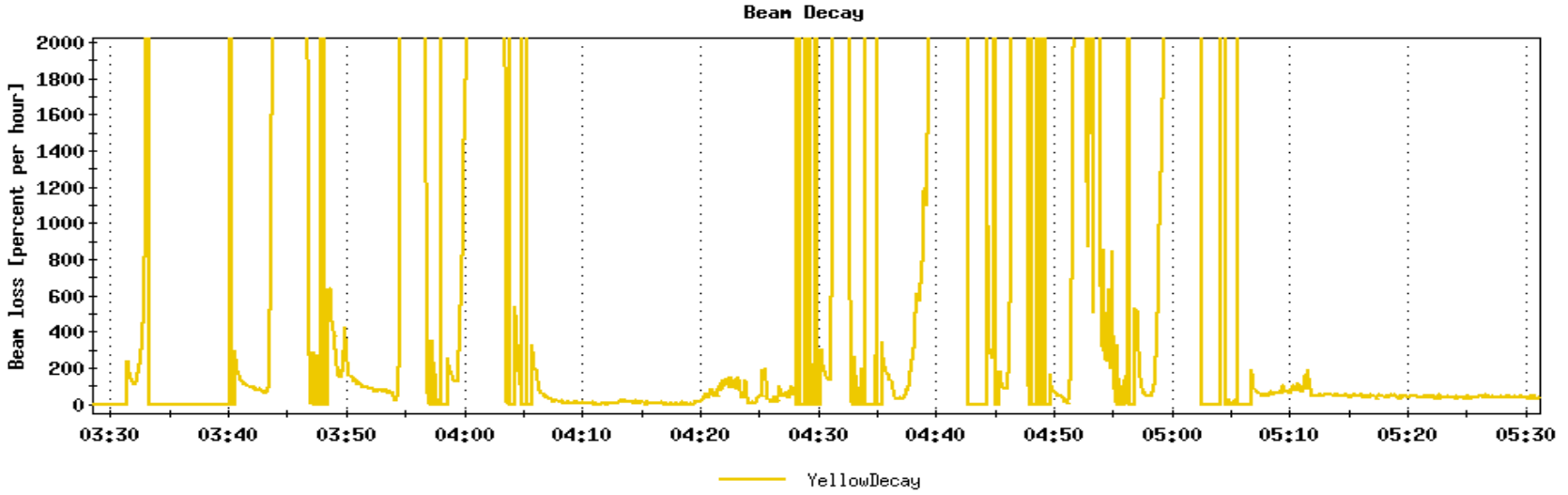
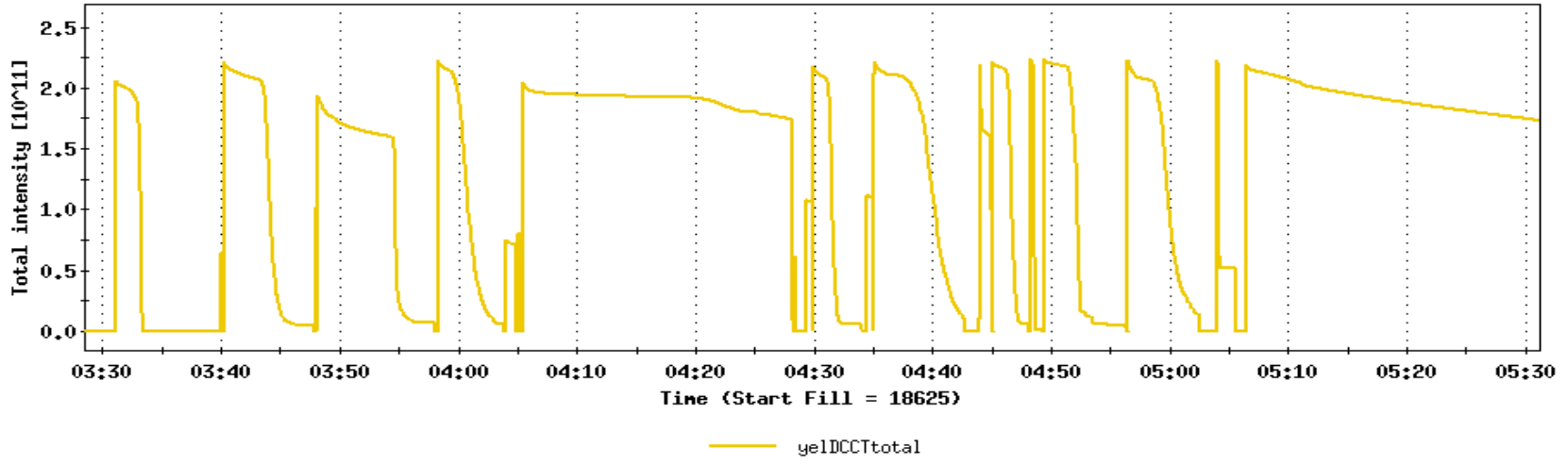
APEX Weekly Meeting, Feb. 13, 2015

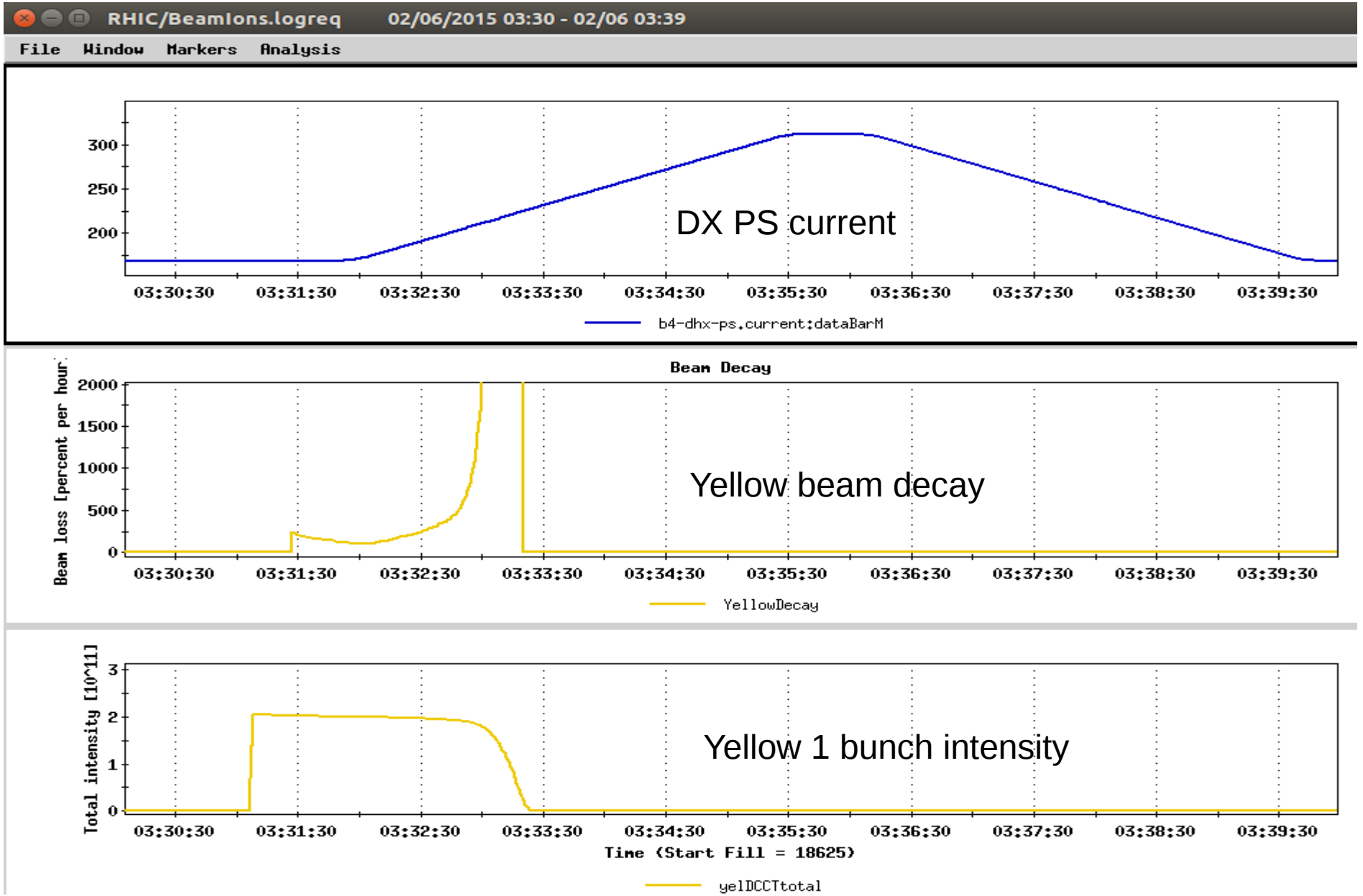
General

Feb. 6, 2015, Fill No. 18625, Yellow beam Only
Using D0 and DX magnets to generate a tilt orbit angle crossing IP
Measure the beam loss and beam decay determining the aperture





Data Analysis



Tilt angles are w.r.t the axis (half angle)

IR	DX PS current (A)	Tilt Angle Range (mrad)	Sharp Loss PS Current (A)	Aperture of Tilt Angle (mrad)
IR4	168.9-->311.6	0-->-5mrad	205.0	1.26
IR2	178.6-->313.1	0-->-5mrad	228.2	1.84
IR12	145.7-->44.4	0-->3mrad	86.1	1.76
IR10	142.9-->42.6	0-->3mrad	89.7	1.59
IR8	143.9-->43.0	0-->3mrad	97.5	1.38
IR6	144.6-->43.8	0-->3mrad	98.0	1.39

DX movement information
For run 2015

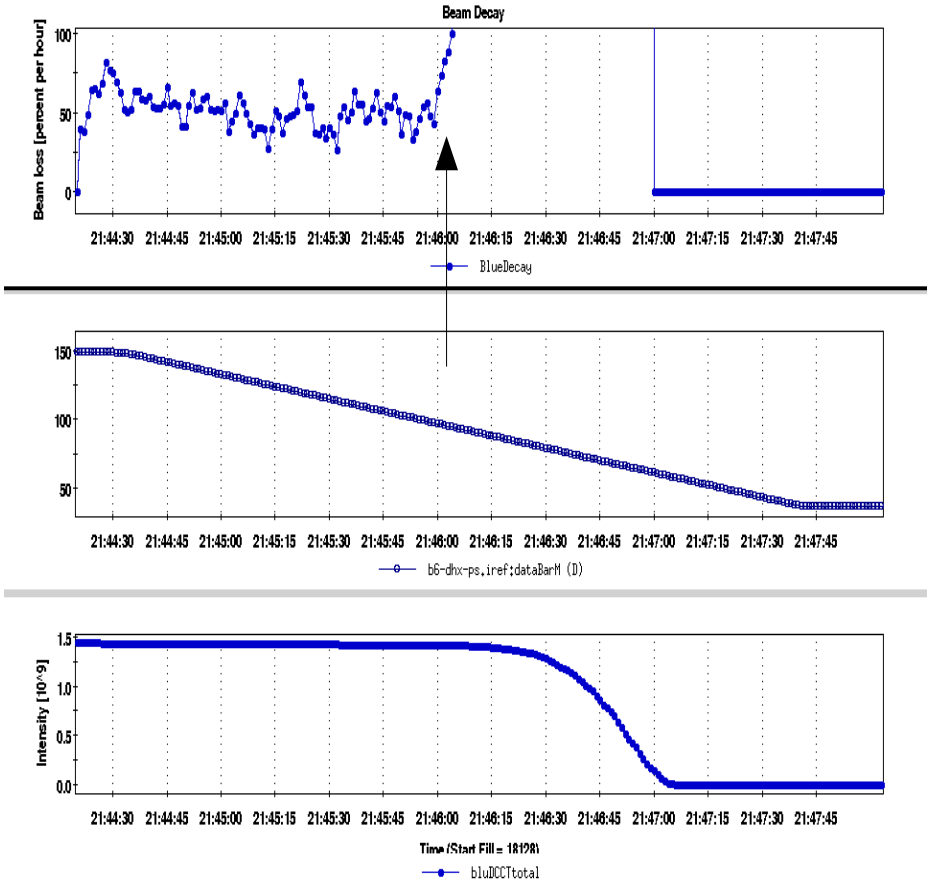
	Sector	Distance (mm)	direction
move before pp	1	20	outwards
	2	20	inwards
	3	17.5	inwards
	4	17.5	outwards
move between pp and p-Au	5	25	outwards
	6	25	inwards
	7	25	inwards
	8	25	outwards
	9	20	outwards
	10	20	inwards
	11	20	inwards
	12	20	outwards

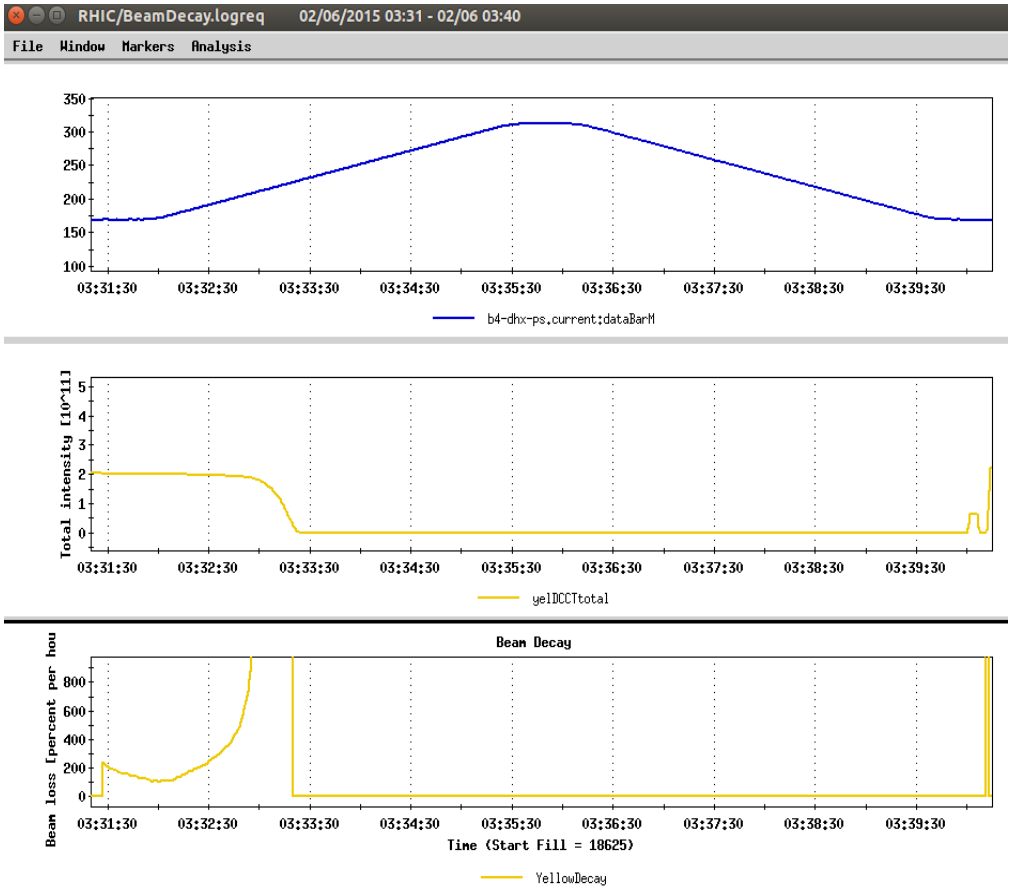
Measurement from 2014,
Fill 18128, Au beam
NO DX MOVEMENT

IR	DX Max Current (A)	DX Min Current (A)	Blue Loss begin (A)	Yellow Loss Begin (A)	Orbit Angle w.r.t. axis (mrad)
IR8	146.66	35.10	97	98	1.45 / 1.42
IR6	148.37	36.69	98	101	1.47 / 1.38
IR2	148.87	37.12	93	97	1.62 / 1.51

Discussions

1) The Yellow beam lifetime at injection during the experiment was very bad which gave difficulty to determine the exact aperture.
2) Need re-do this experiment.





2014: Fill 18128

2015: Fill 18625