Update on cryo-collimators for Phase 2 ion collimation

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"2009" Phase II optics- IR7 only

Proposed layout:
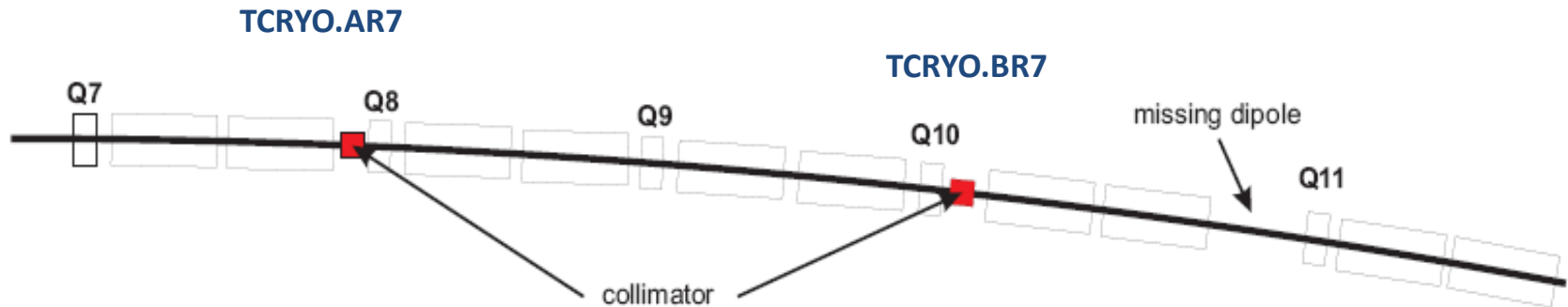
TCRYO.AR7

TCRYO.BR7

TCRYO.AR7 at 300.19m from IP7 – 1m long jaws

TCRYO.BR7 at 387.29 from IP7 – 1m long jaws

Gap in #s	
TCP	6.0
TCSG	26.5
TCSM	7.0
TCRYO	15.0
TCLA	10.0
TCT	retracted

From the external review in 2009…

Cu TCRYOs at 30σ

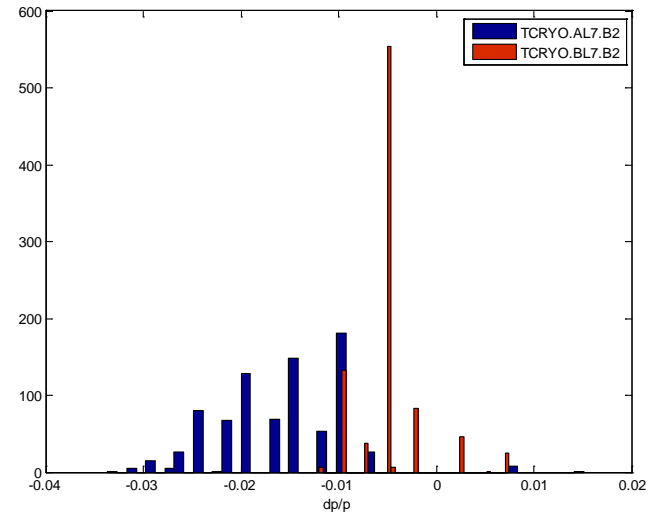Beam1, Pb208 @ 7TeV eq. collision optics
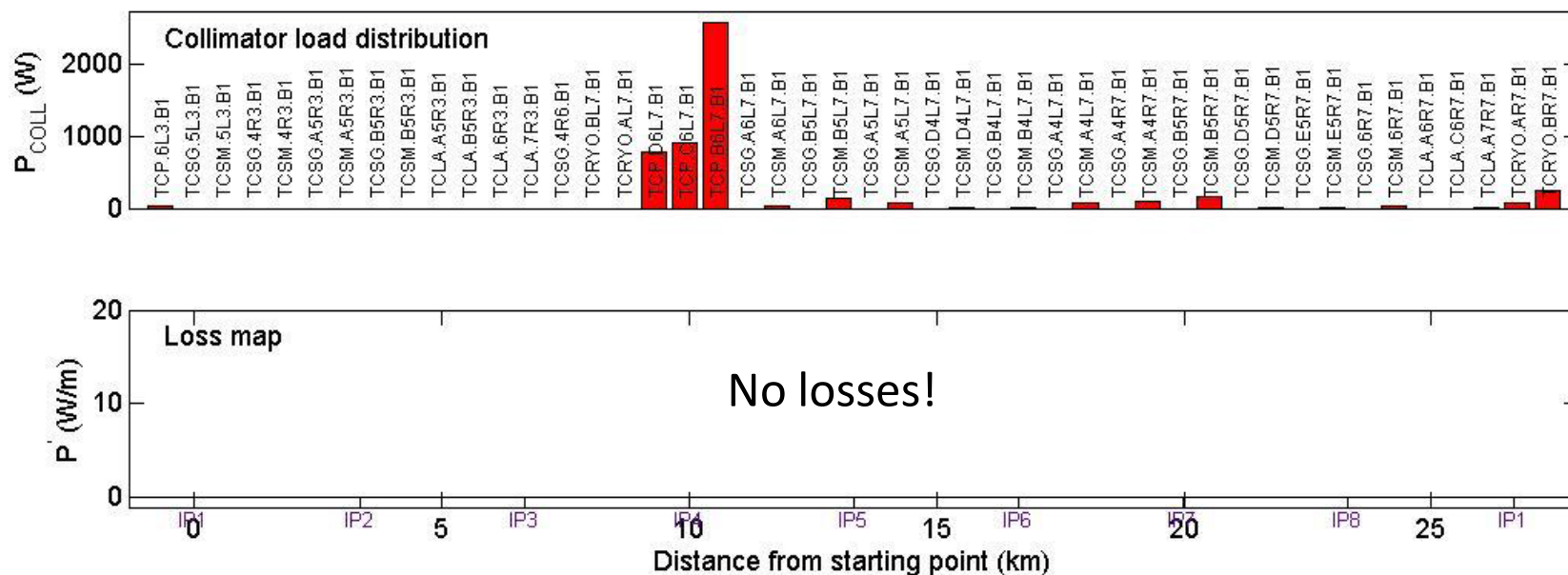
Power load on cryogenic collimators

Gap size	TCRYO.AR7	TCRYO.BR7
15σ	186 W	180 W
30σ	83 W	260W
45σ	21 W	190 W

Nominal Pb208 beam2, 7TeV eq.,Cu TCRYOs at 15σ , τ=12min, distributions after 20 turns
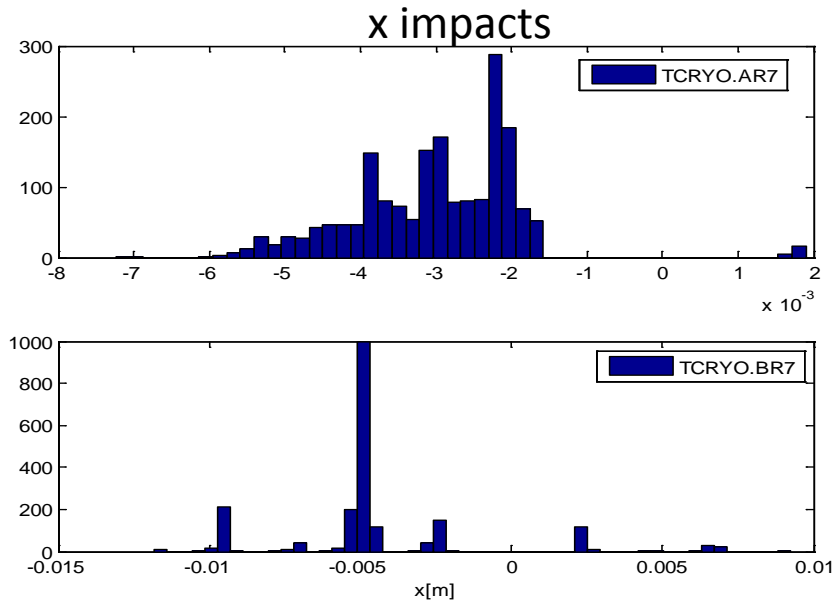
TCRYOs impacts, x distribution
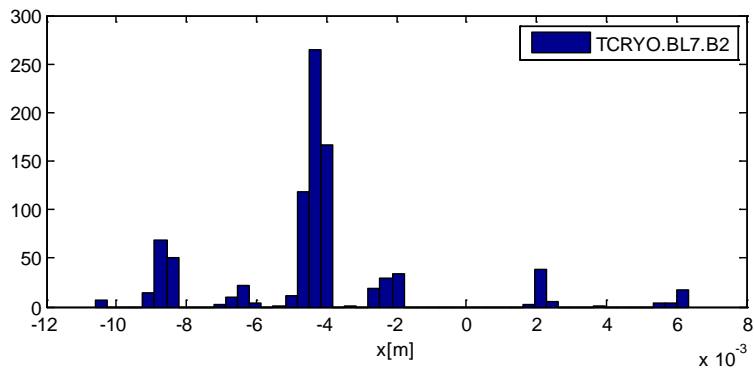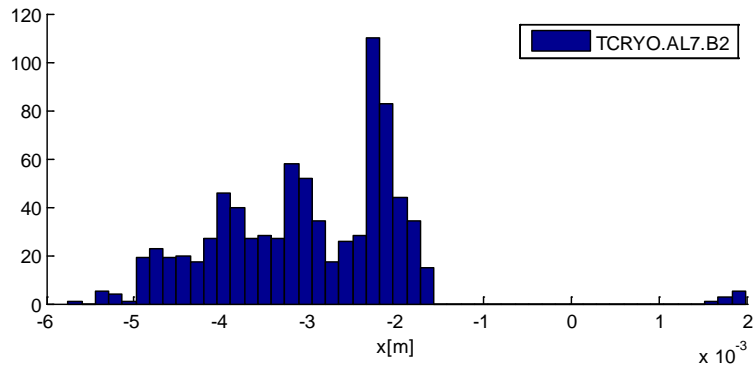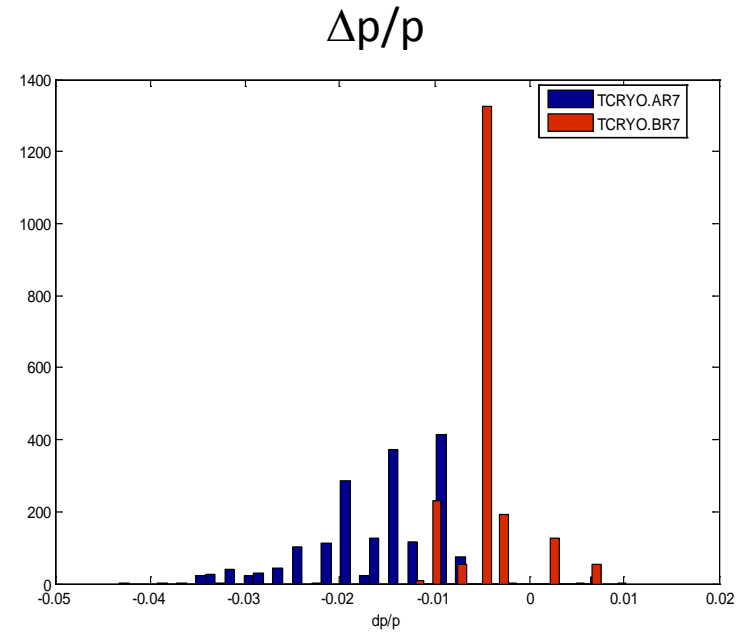

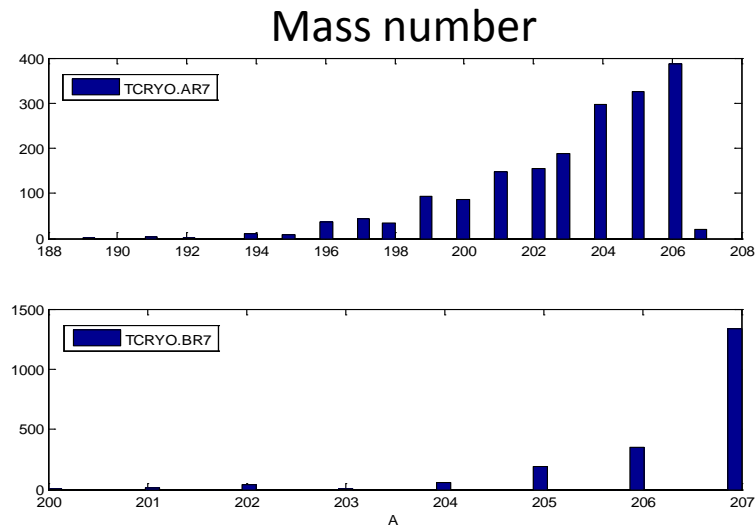## Effective $\Delta p/p = Z1/A1*A2/Z2-1$

Fraction of total collimator
impacts on r.h.s. jaw:
TCRYO.AL7 = 1.1% (of ~120W)
TCRYO.BL7 = 8%   (of ~130W)
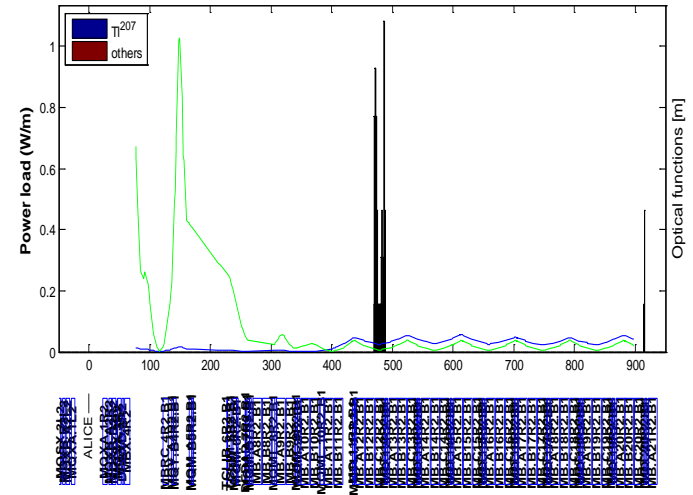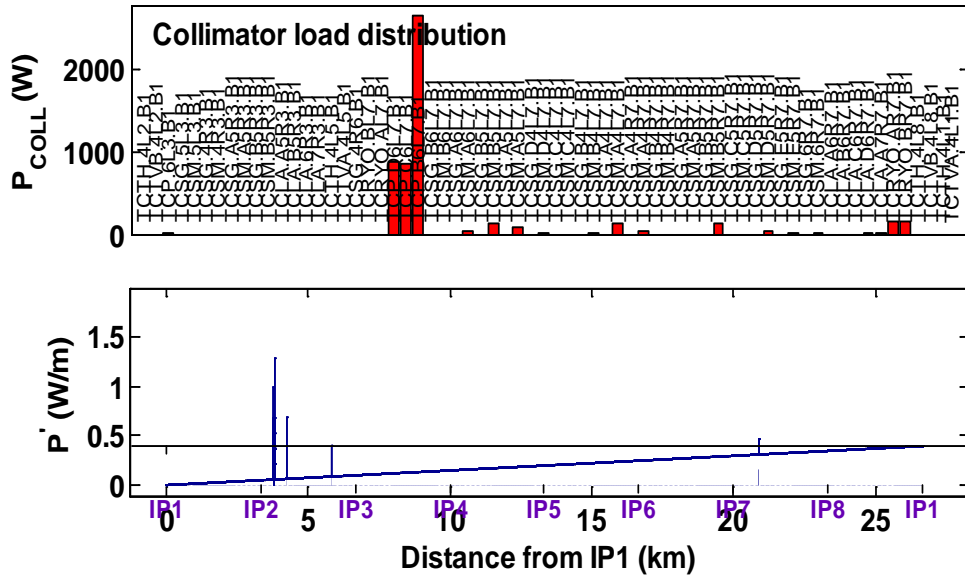
Nominal Pb208 beam1, 7TeV eq., <u>tungsten</u> TCRYO at 15σ, τ=12min

x impacts

Fraction of total collimator
impacts on r.h.s. jaw:
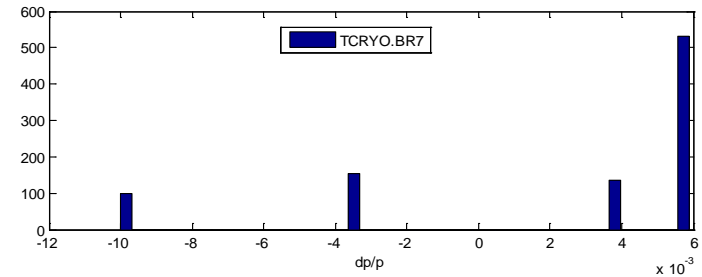TCRYO.AR7 = 1.1%
TCRYO.BR7 = 9.3%

Mass number

Δp/p

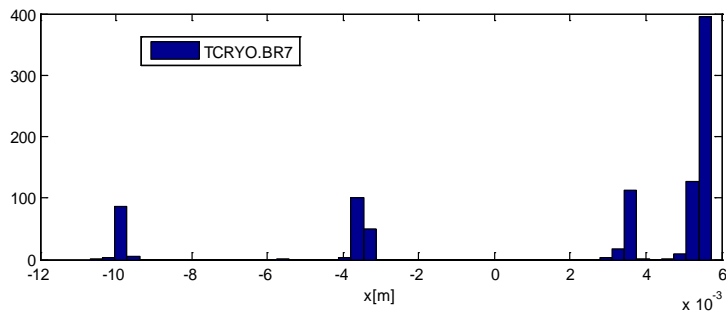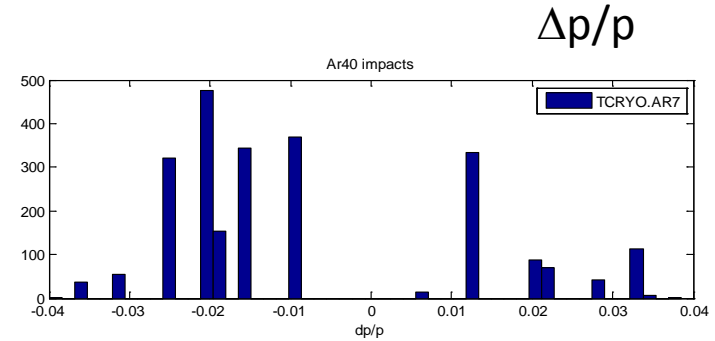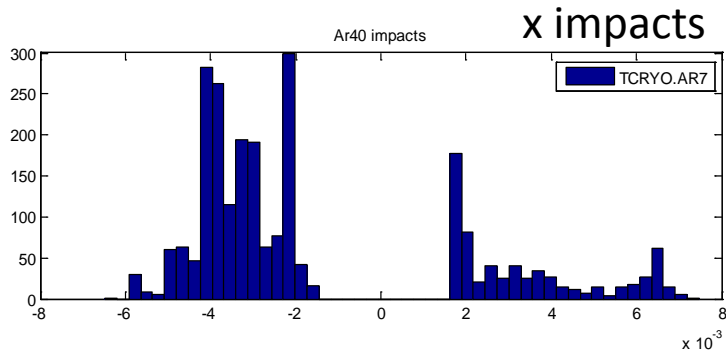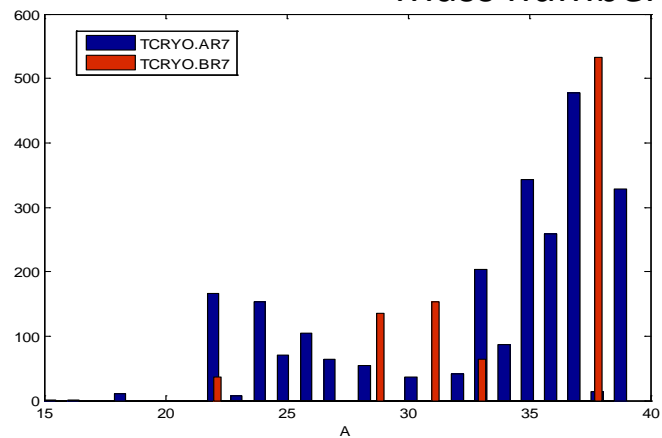# Nominal Pb208 beam1, 7TeV eq., tungsten TCRYO at 15σ, τ=12min – one jaw only, 100 turns

50k particles: 34k lost on collimators,
55 on aperture→
0.2% inefficiency

Nominal Ar40 beam1, 7TeV eq, tungsten TCRYO at 15σ, τ=12min

x impacts
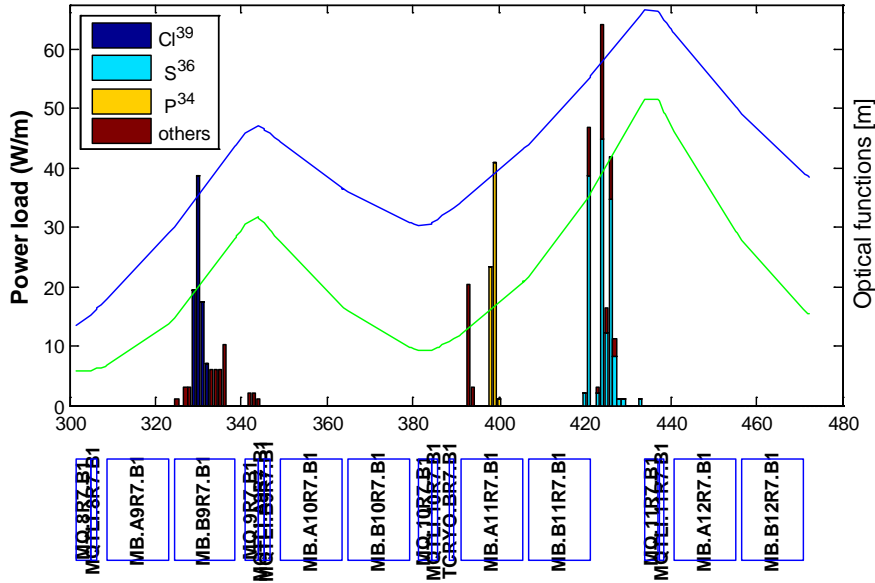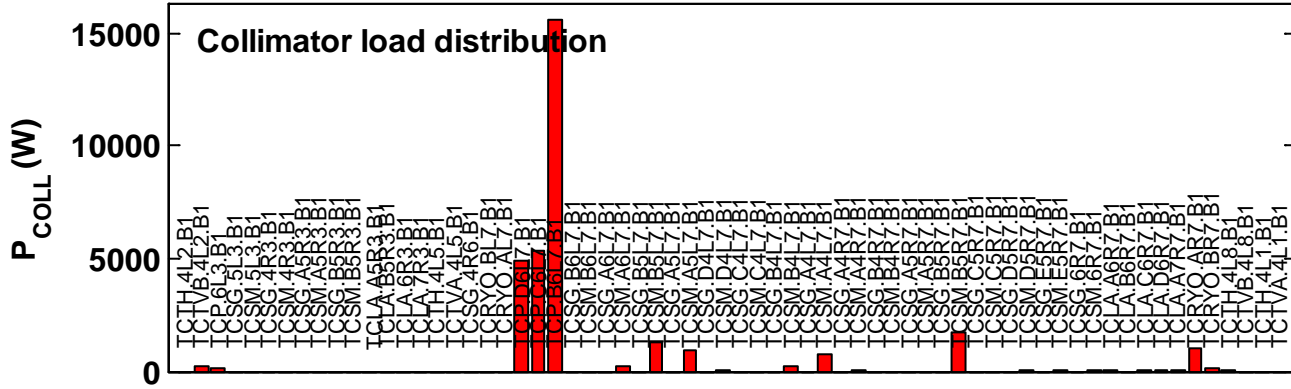
$\Delta p/p$

Mass number

Fraction of total collimator
impacts on r.h.s. jaw:
TCRYO.AL7 = 27%
TCRYO.BL7 = 72%

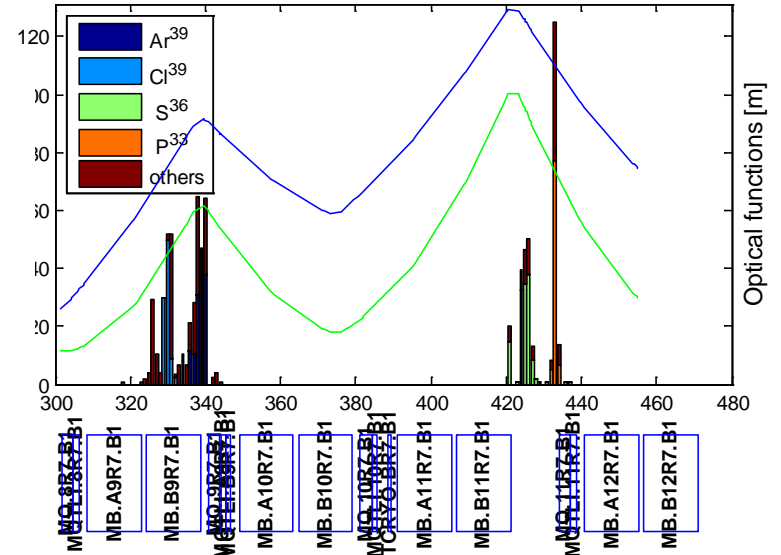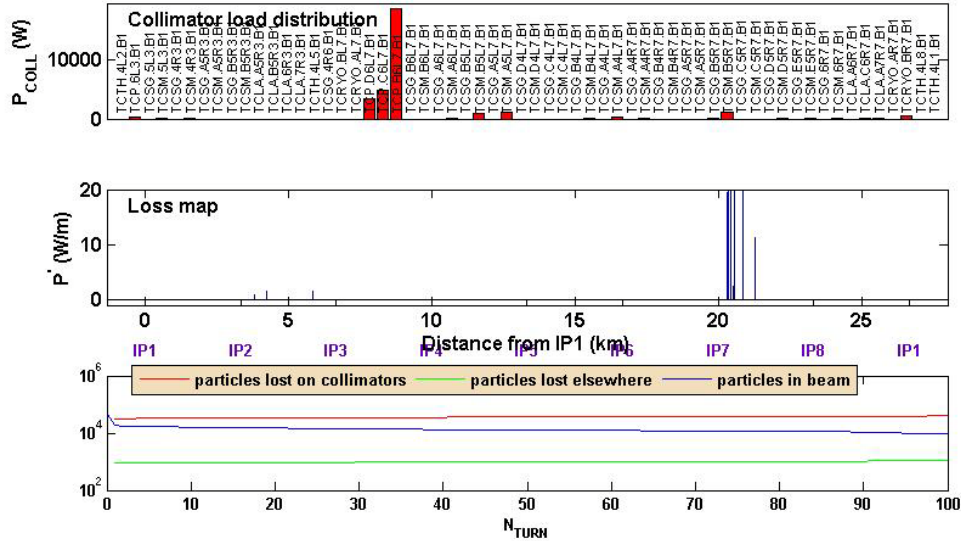# Nominal Ar40 beam1, 7TeV eq, tungsten TCRYO at 15σ, <u>one jaw only</u>, I=2e9 ppb, τ=12min

50k particles
η=1.2% inefficiency

For reference, 2009 simulations for nominal Ar40 beam1, 7TeV eq, copper TCRYOs, I=2e9 ppb, τ=12min, 100 turns

TCRYOs retracted

TCRYOs closed at 15σ

No losses!