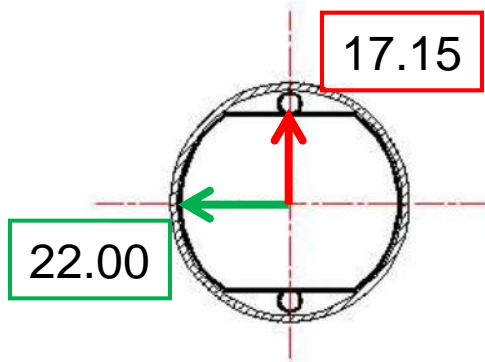




Updates on MAD-X simulations of ADT fast losses quench test

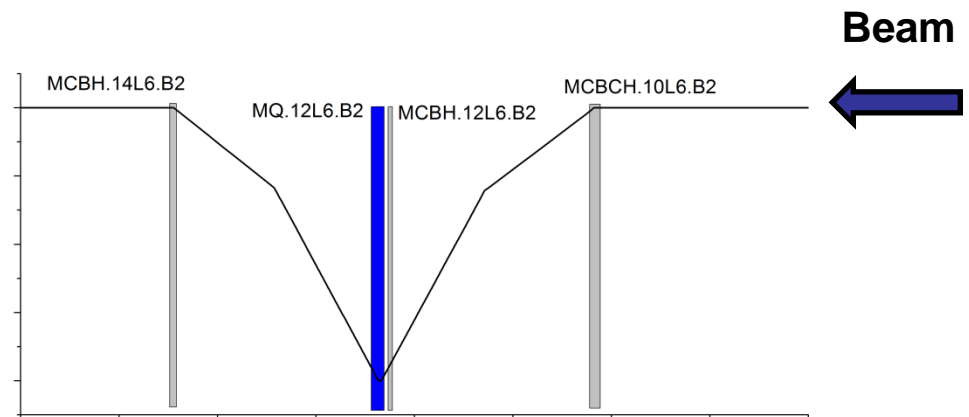
V.Chetvertkova

Beam screen and the closed-orbit bump



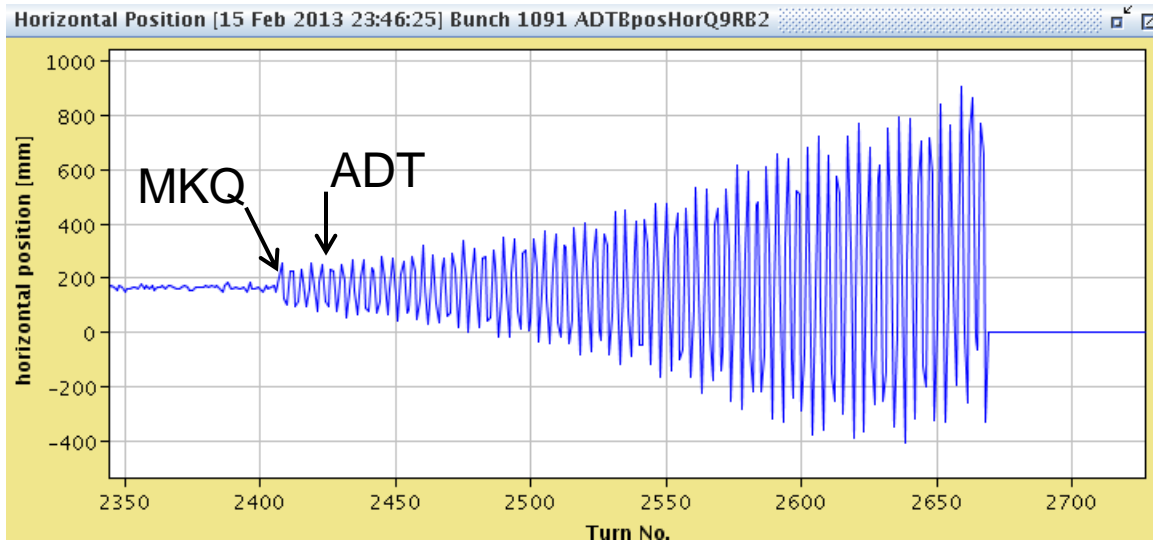
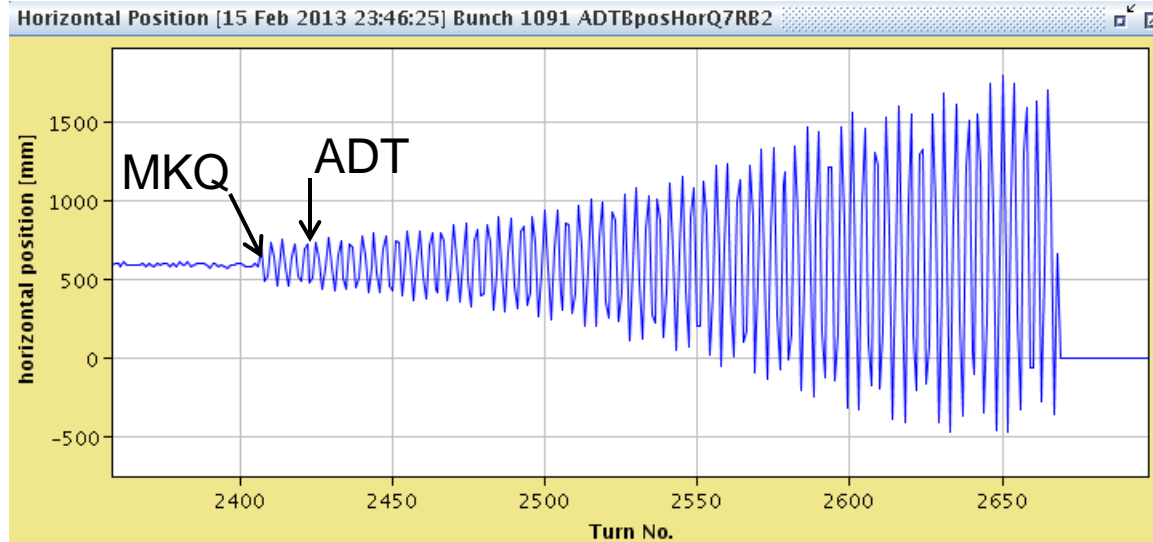
- MCBH.14L6
- MCBH.12L6
- MCBCH.10L6
- MQ.12L6
- MS.12L6

- Maximum of the bump is at the MQ.12L6.B2
- Offset at the MQ.12L6.B2: 4.3σ
(= distance from the reference orbit 2.0364314 cm)



MKQ and ADT part

- Beam position at ADT pickups:
 - BPMCA.7R4
 - BPMC.9R4
- MKQ kick (1 turn)
- ~1 ms after the MKQ kick:
 - ADT kicks



1. Shift the curves in such a way that the beam position during the 1st phase (3CB) oscillates around zero.
2. Fit the position of the beam at the pickups

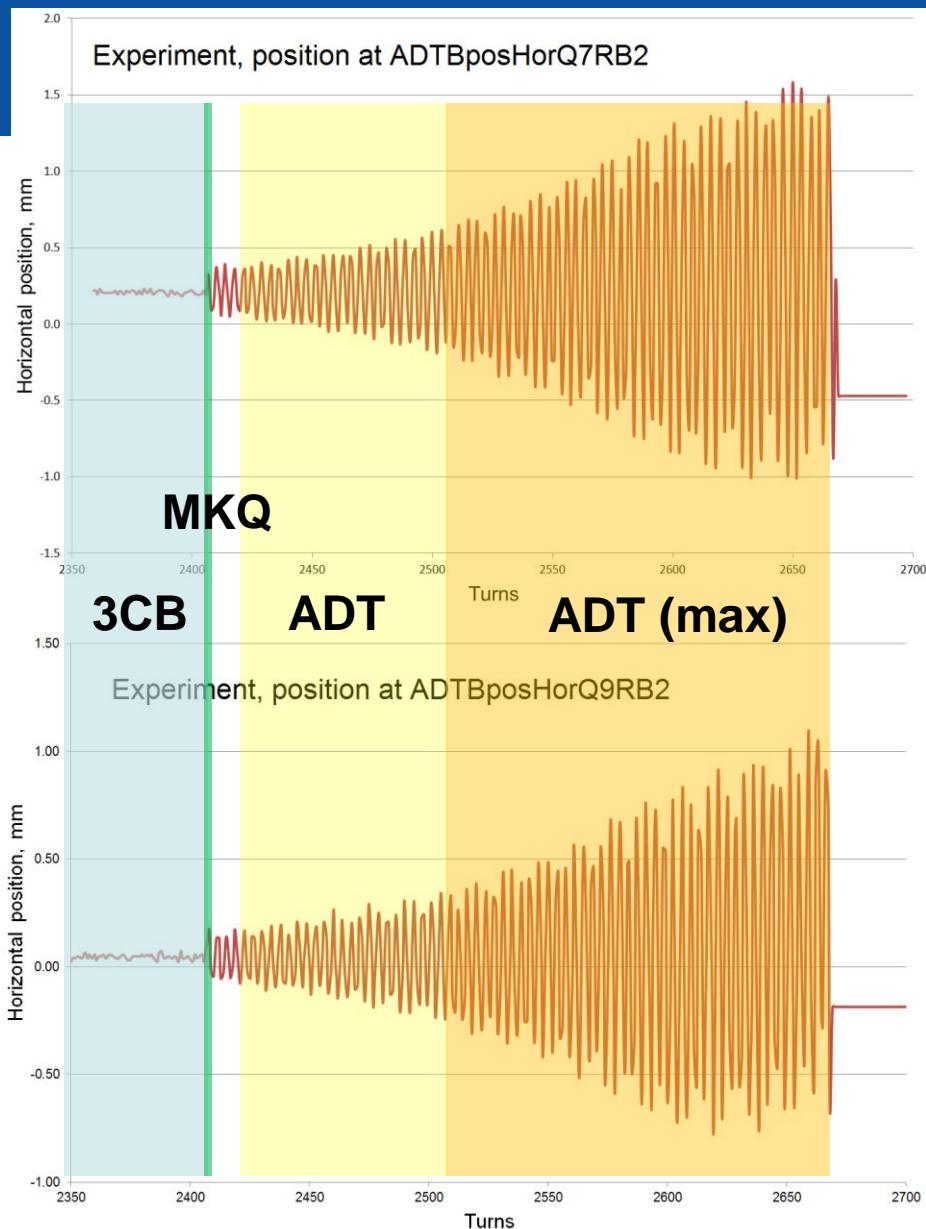
MKQ kick - constant

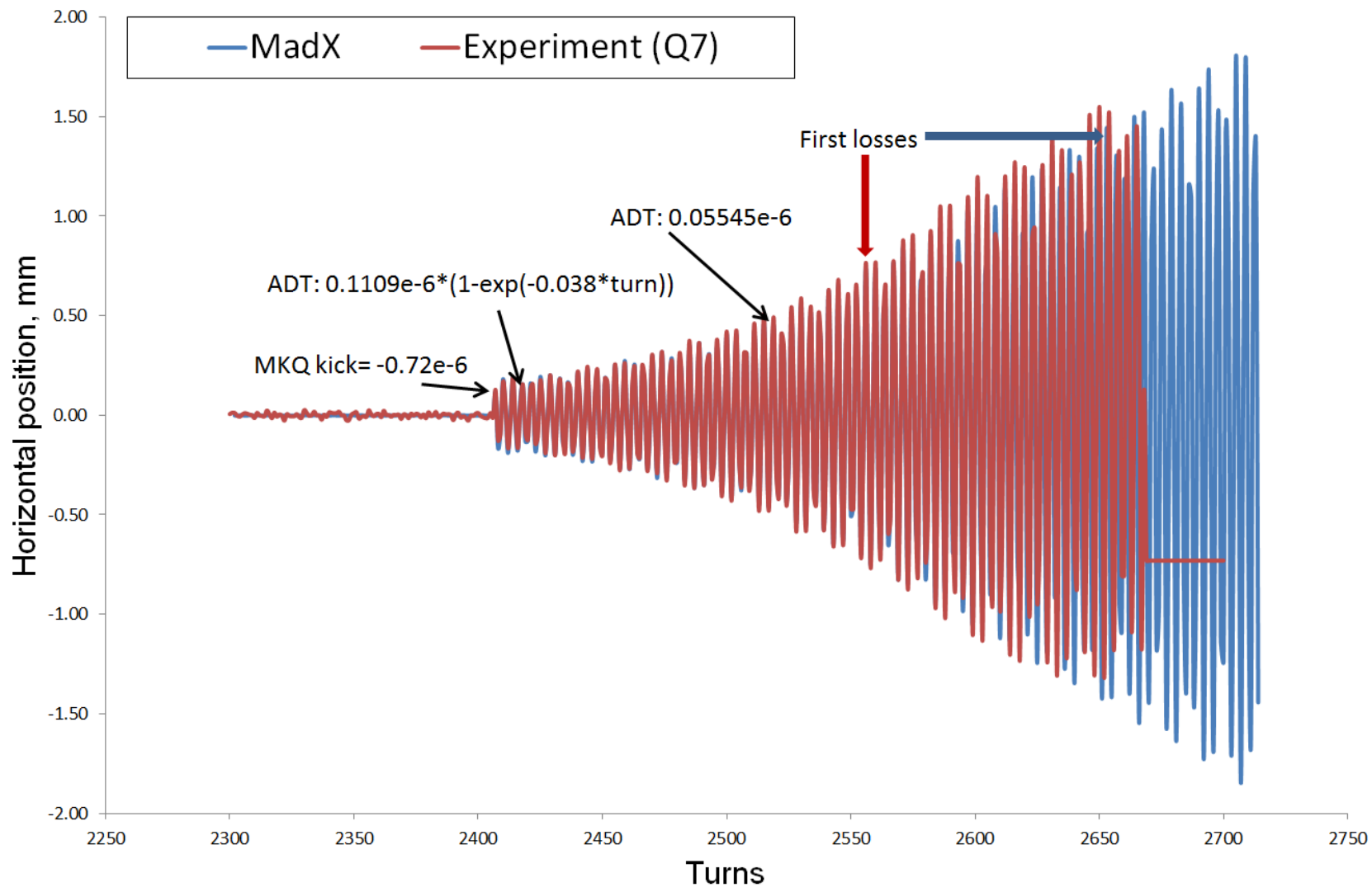
$$ADT = ADT(max) * K * (1 - \exp(-\lambda * t))$$

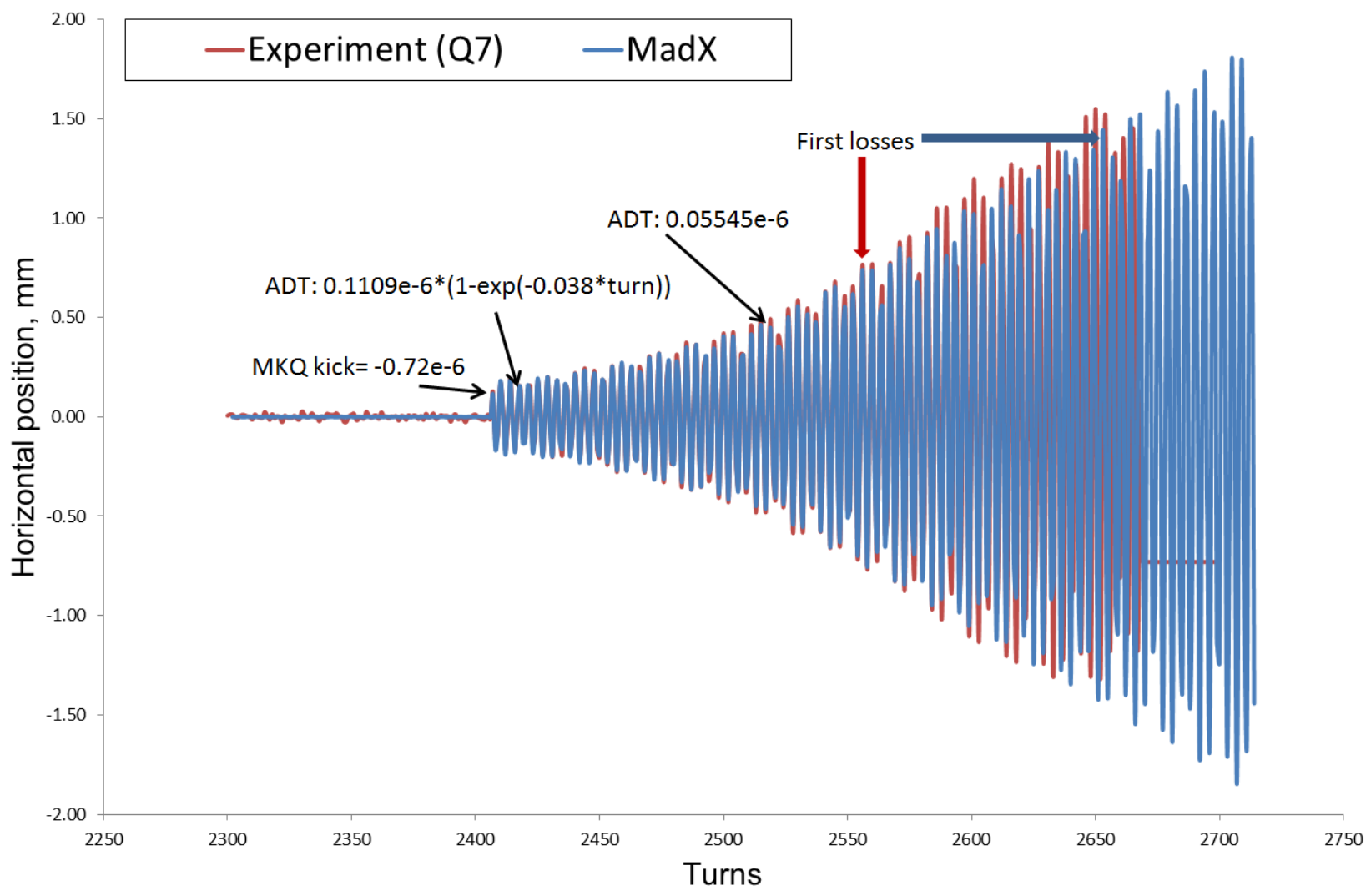
K – fitting coefficient

λ – “time constant”

t – turn

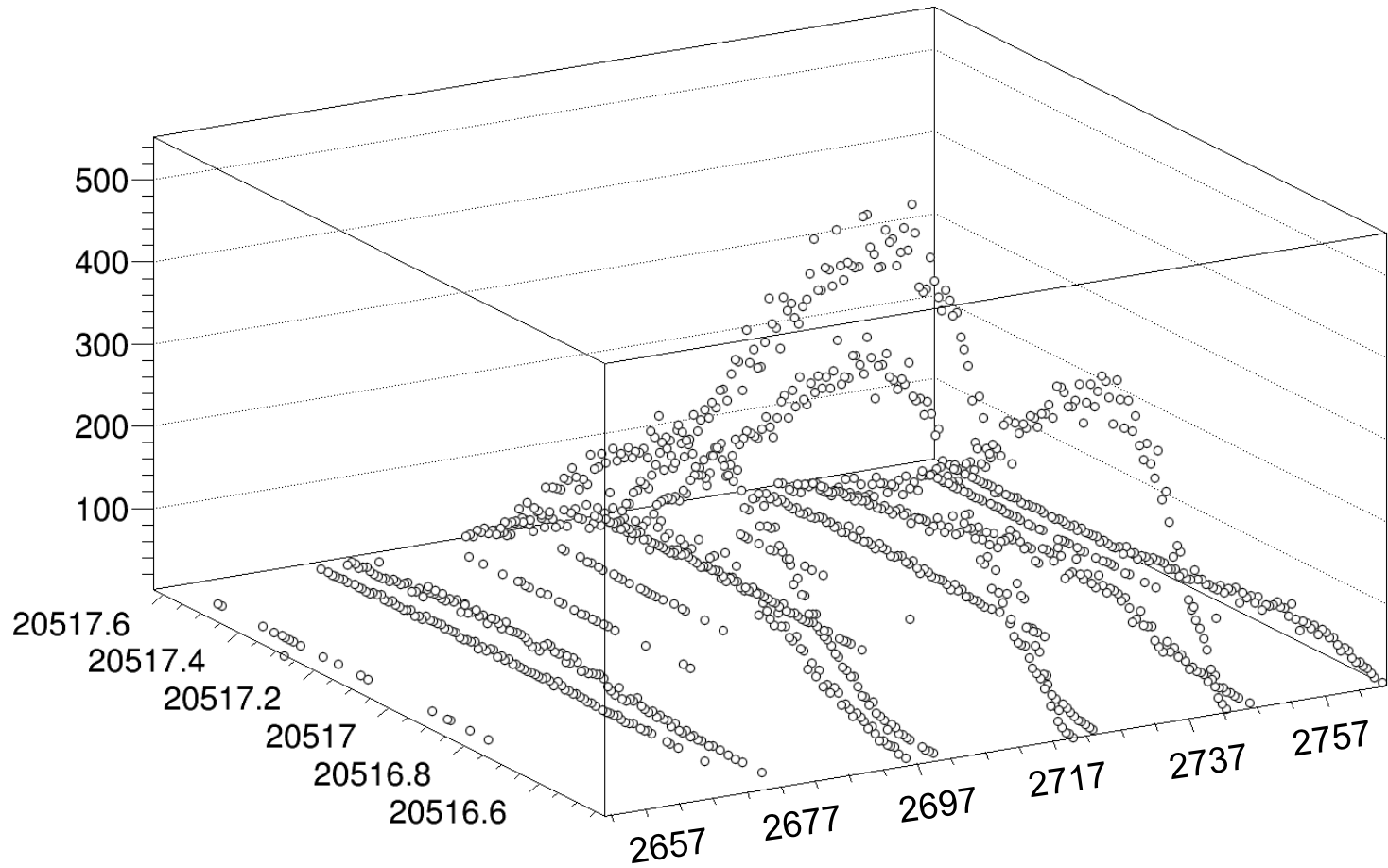




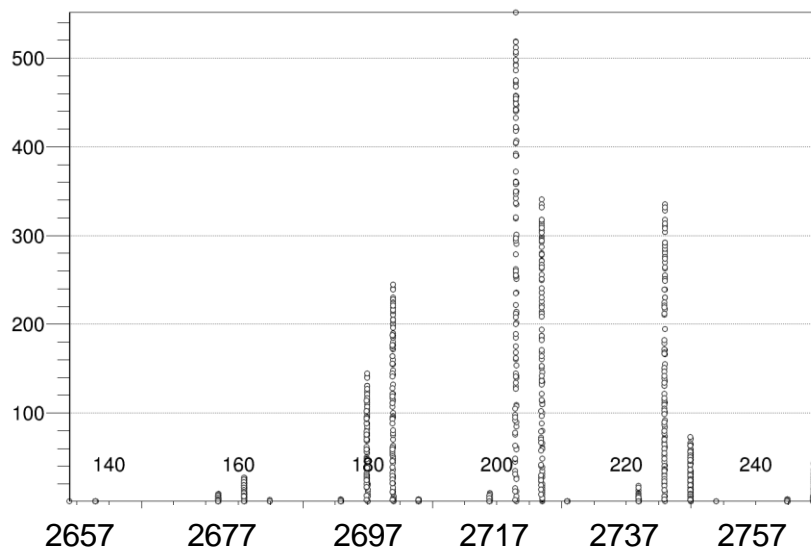


Total intensity $1e5$ protons

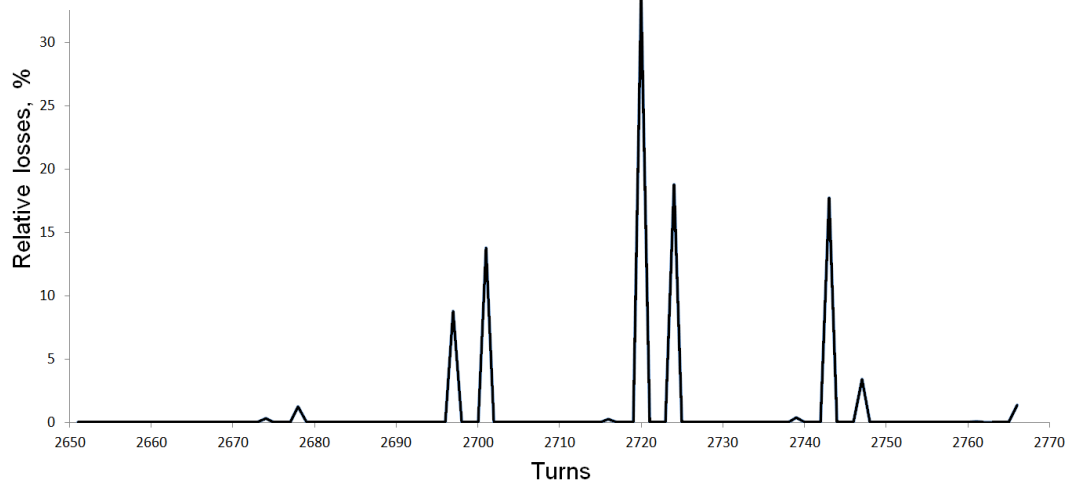
Duration of losses 10.235 ms

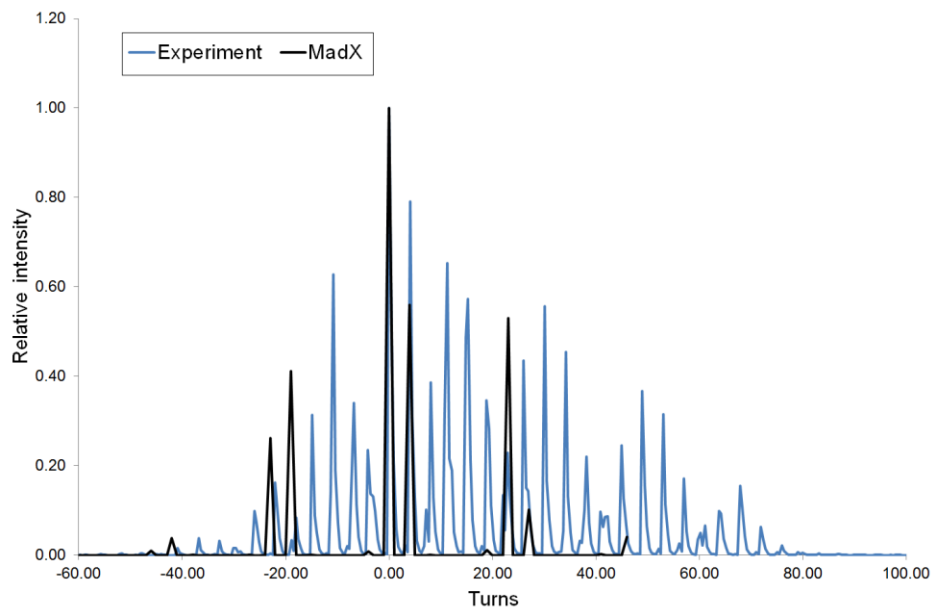


Total intensity 1e5 protons



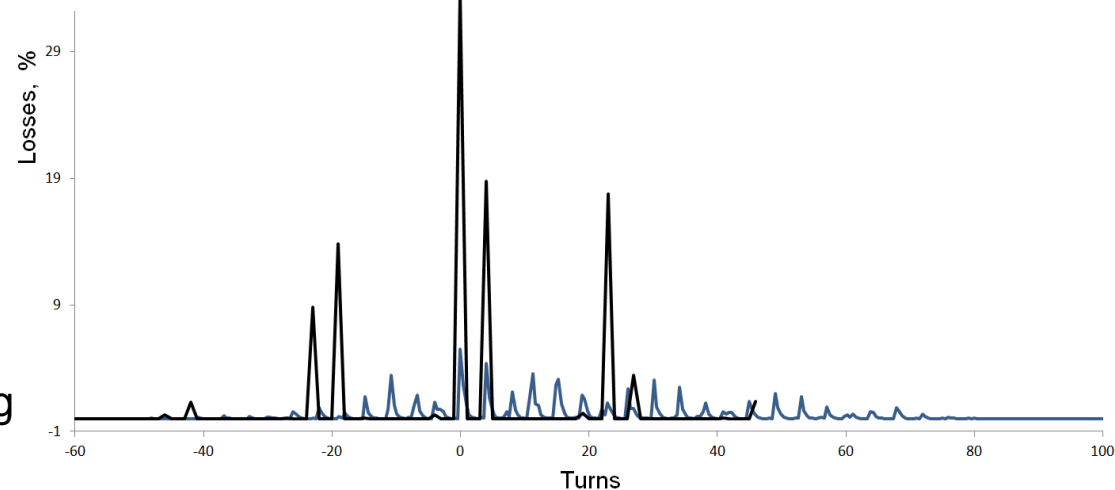
Duration of losses 10.235 ms





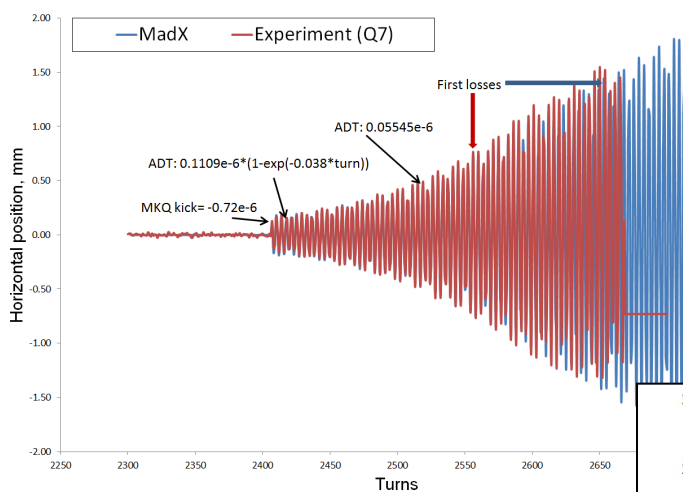
Total intensity $1e5$ protons

Duration of losses 10.235 ms



Experiment: 40 us tracking

MadX: 89 us (turn-by-turn) tracking

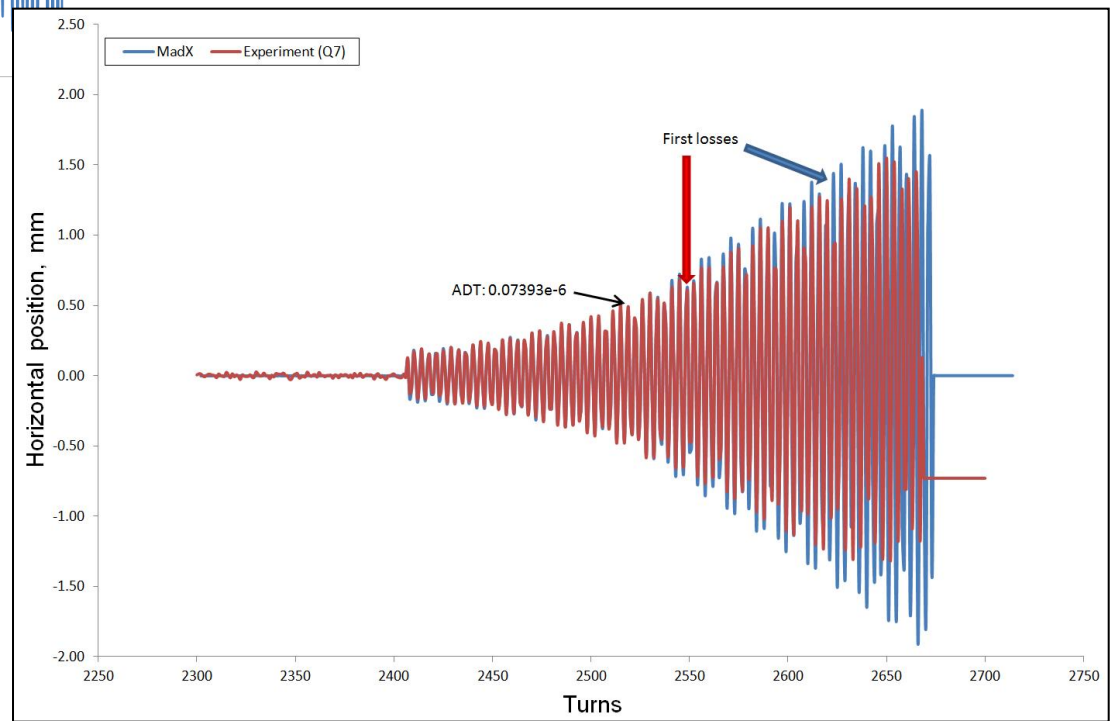


1st fit. ADT settings:
 ADT: $0.1109e-6 \cdot (1 - \exp(-0.038 \cdot \text{turn}))$
 ADT(max): $0.05545e-6$

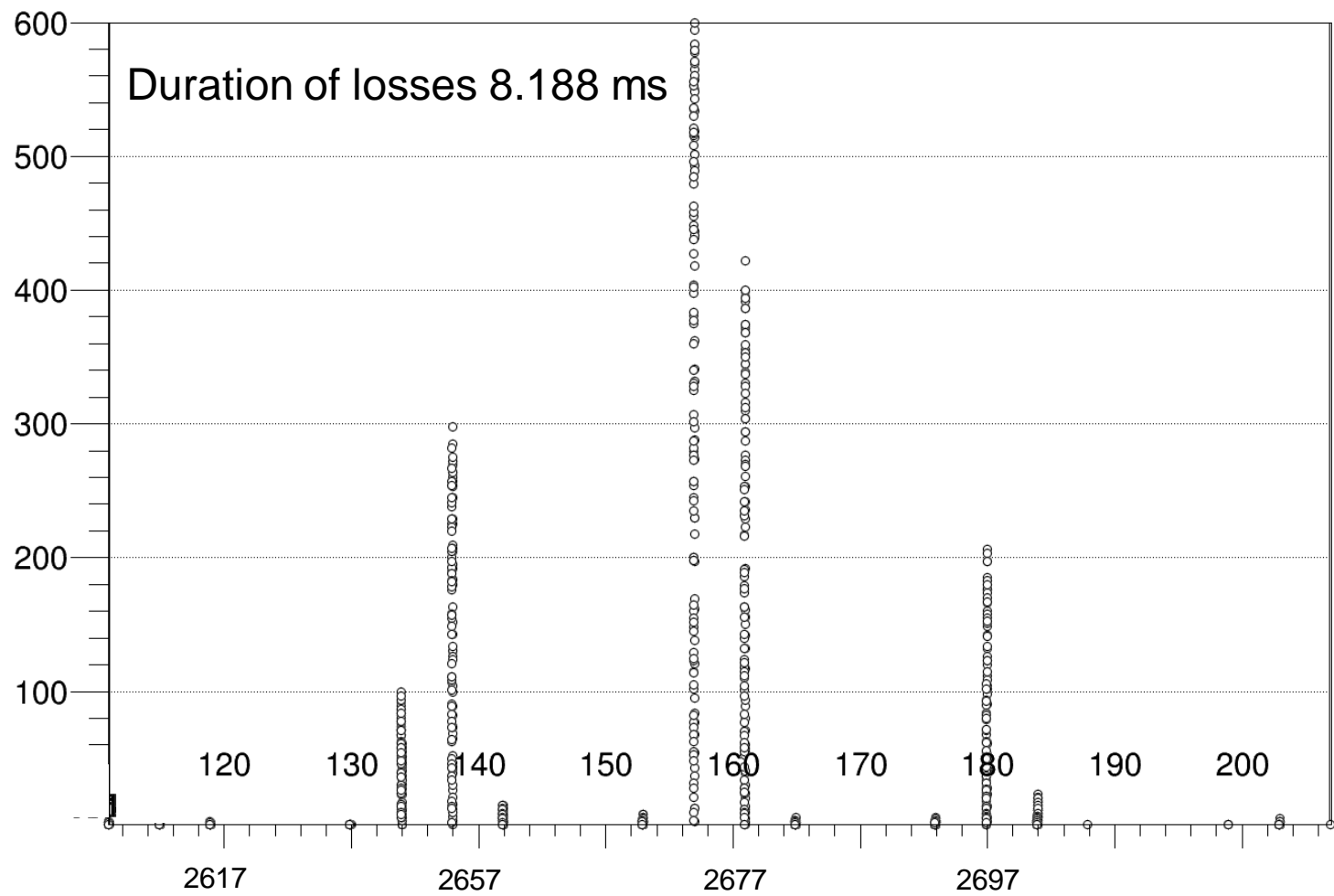
2nd fit. ADT settings:
 ADT: the same as before
 ADT(max): $0.07393e-6$

↓

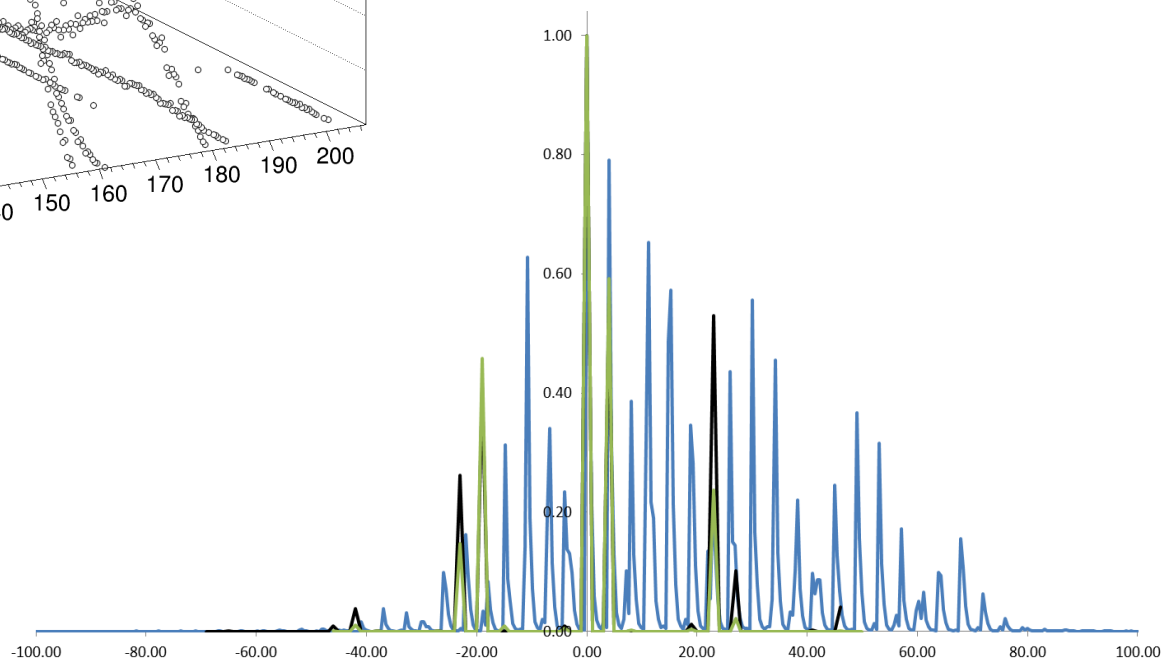
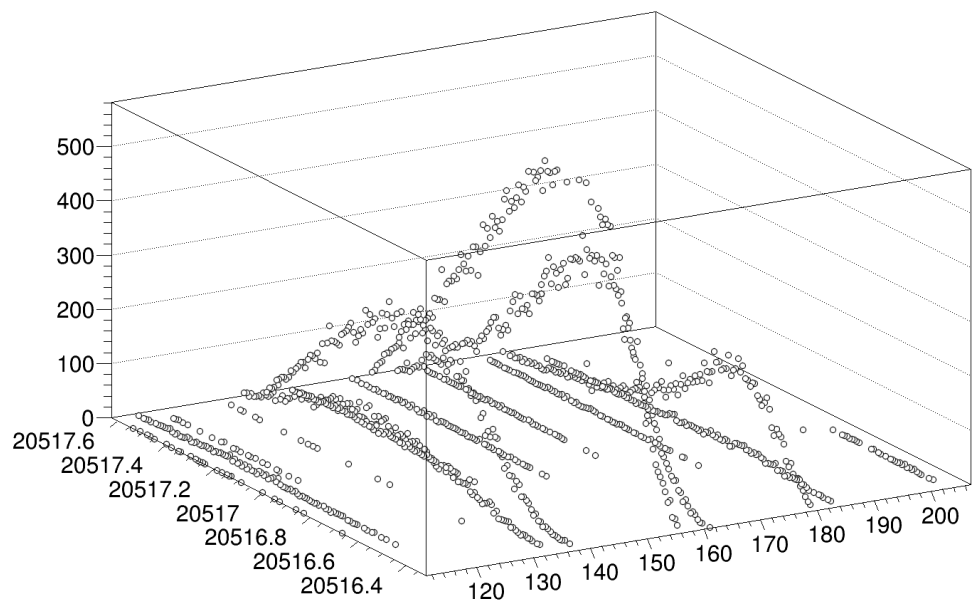
Losses start 23 turns earlier



Total intensity 1e5 protons



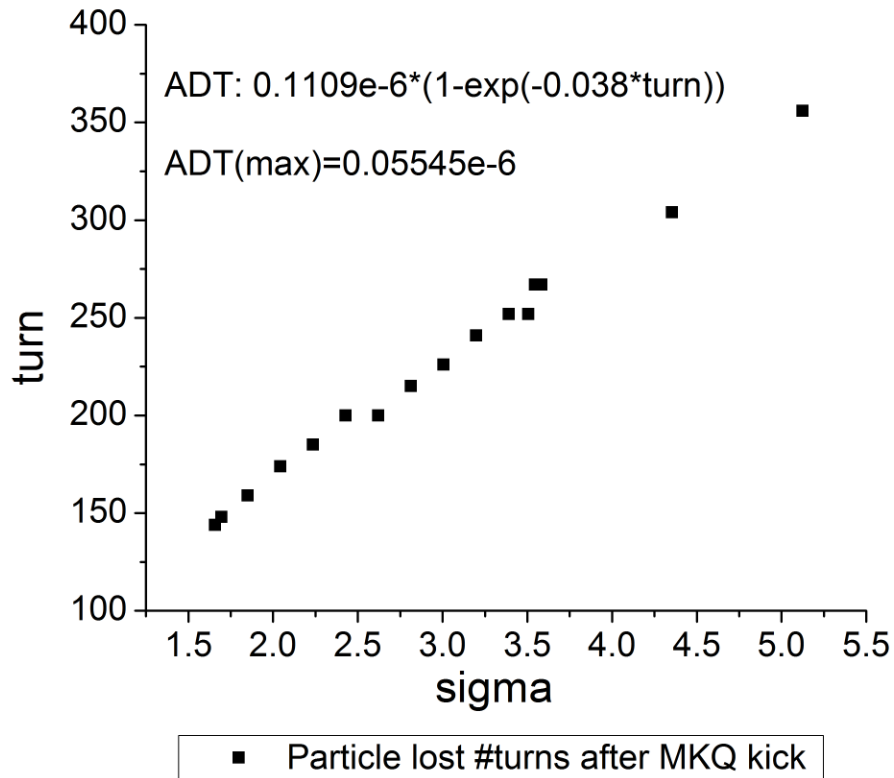
Total intensity 1e5 protons



Challenges

1. How to have losses earlier?

Change the offset (amplitude of the bump):

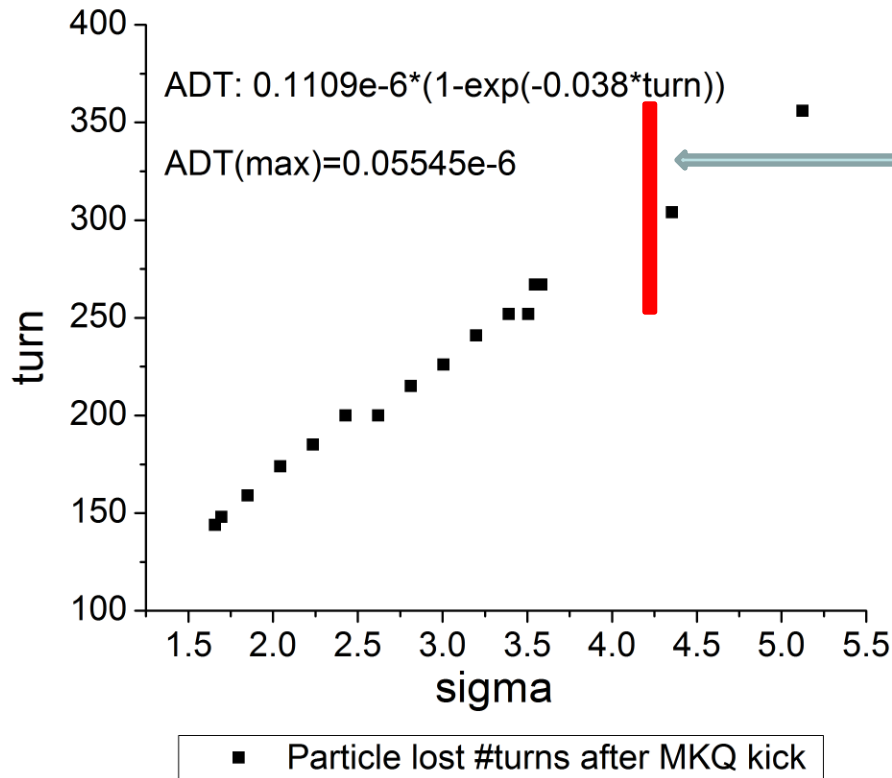


One particle at
 $x=px=y=py=t=pt=0$

Challenges

1. How to have losses earlier?

Change the offset (amplitude of the bump):



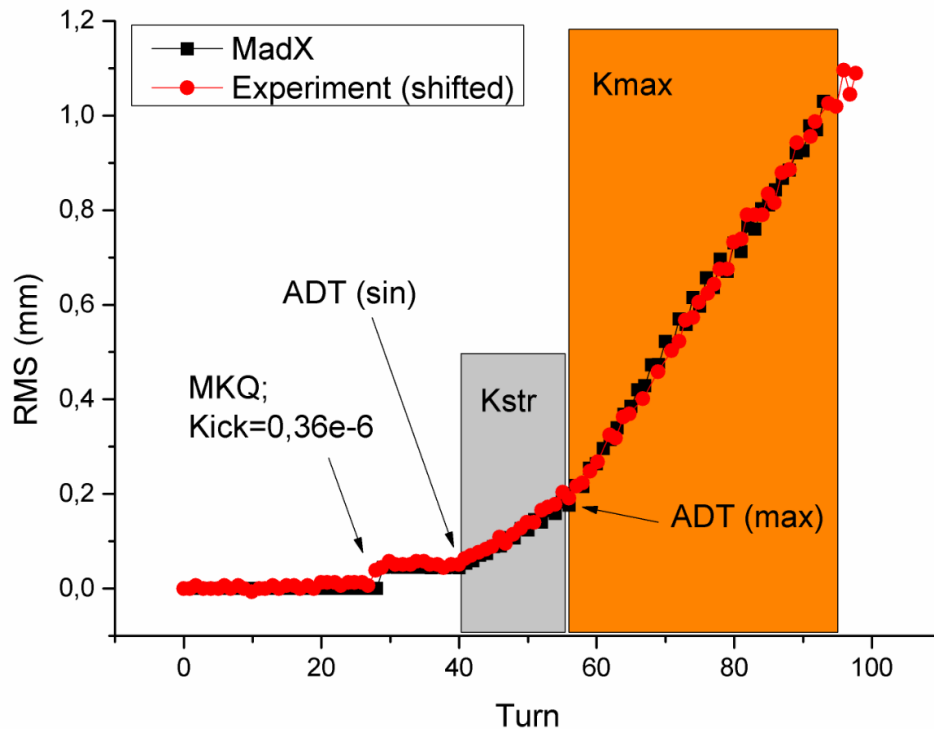
Beam with $1e5$ p
(beam size: exp)

One particle at
 $x=px=y=py=t=pt=0$

2. MKQ kick

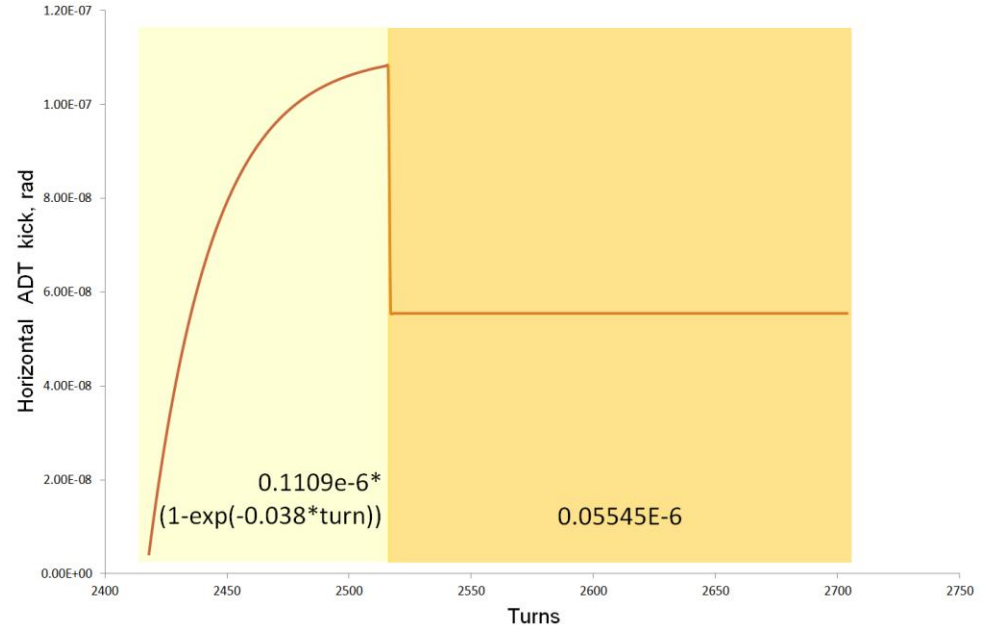
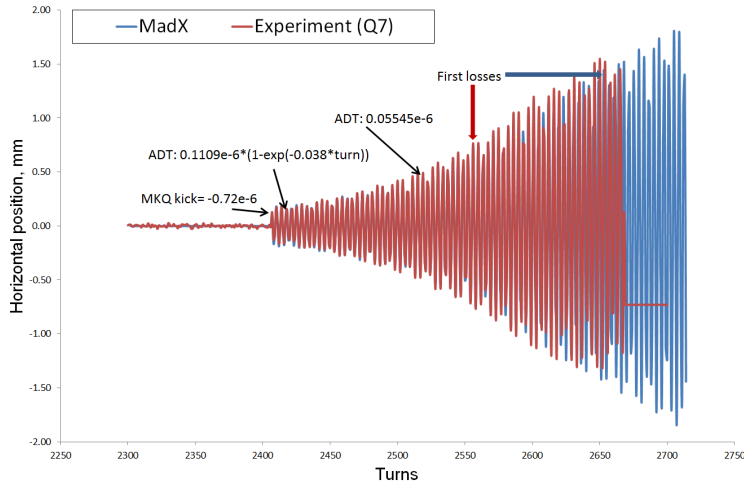
The kick strength at 100% should be 0.72 urad

October 2012 test:



Why are there differences?

3. ADT kick



What is the ADT excitation function?