Multi-particle tracking:

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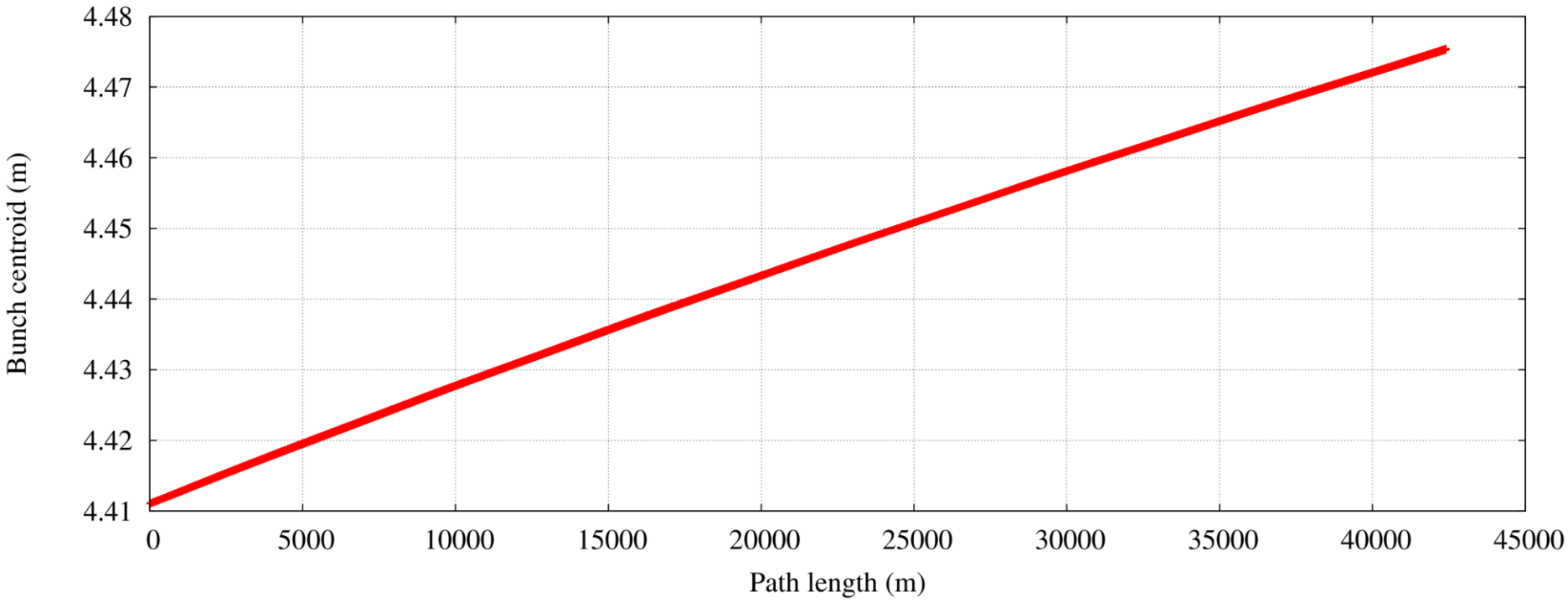
MALEK HAJ TAHAR
Doctoral student
UJF-Grenoble, BNL C-AD

BROOKHAVEN NATIONAL LABORATORY

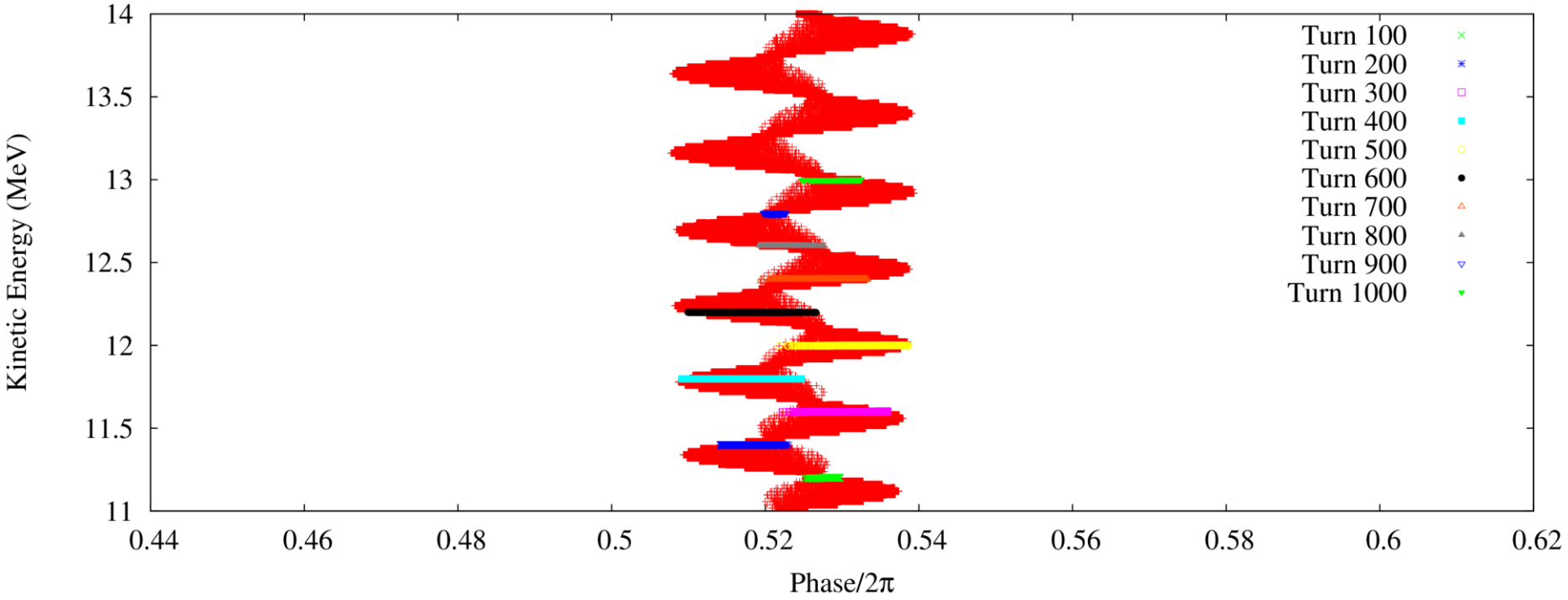
GRENOBLE 1 UNIVERSITE JOSEPH FOURIER SCIENCES.TECHNOLOGIE.SANTÉ

Bunch centroid



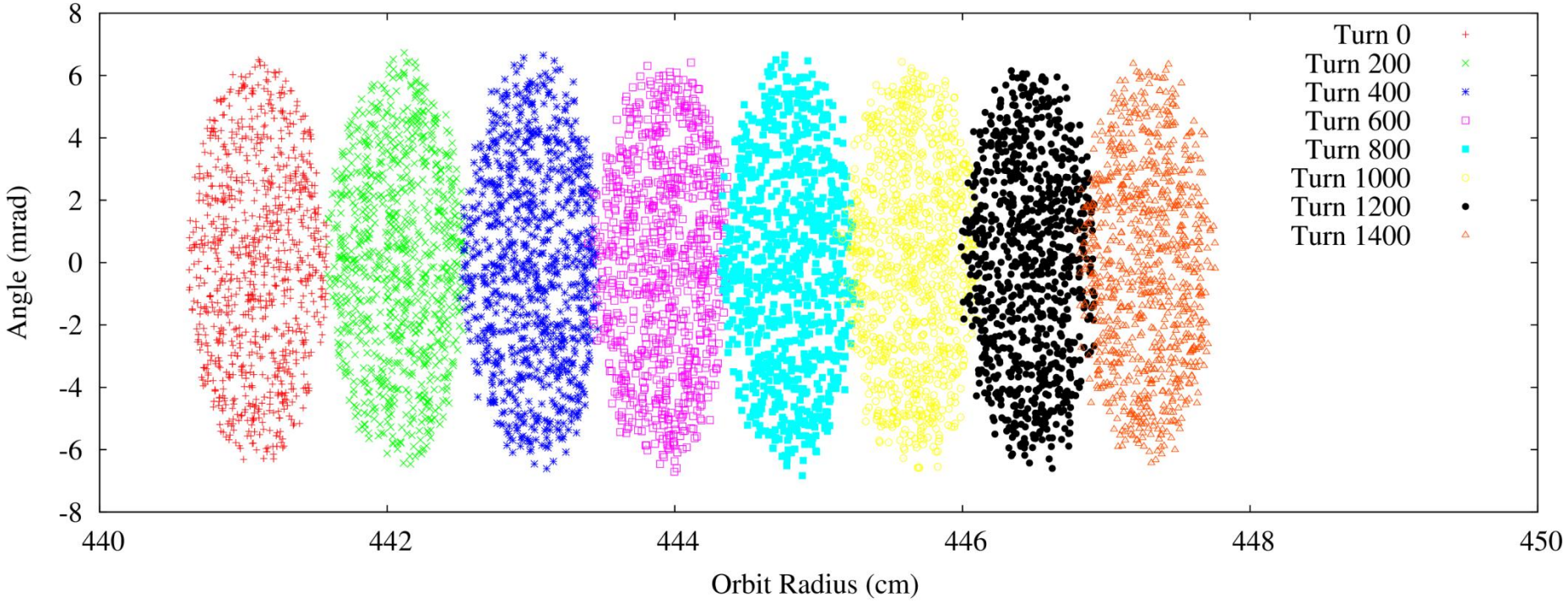
Track a distribution of particles with acceleration. Variable RF included, $V_{RF} = 4\ kV$ and ϕs = 30 deg.

No matching in the longitudinal phase space



A KV beam distribution is generated in the transverse phase space.
In the longitudinal phase space the beam is flat with no energy spread (emittance = 0).
No matching yet.

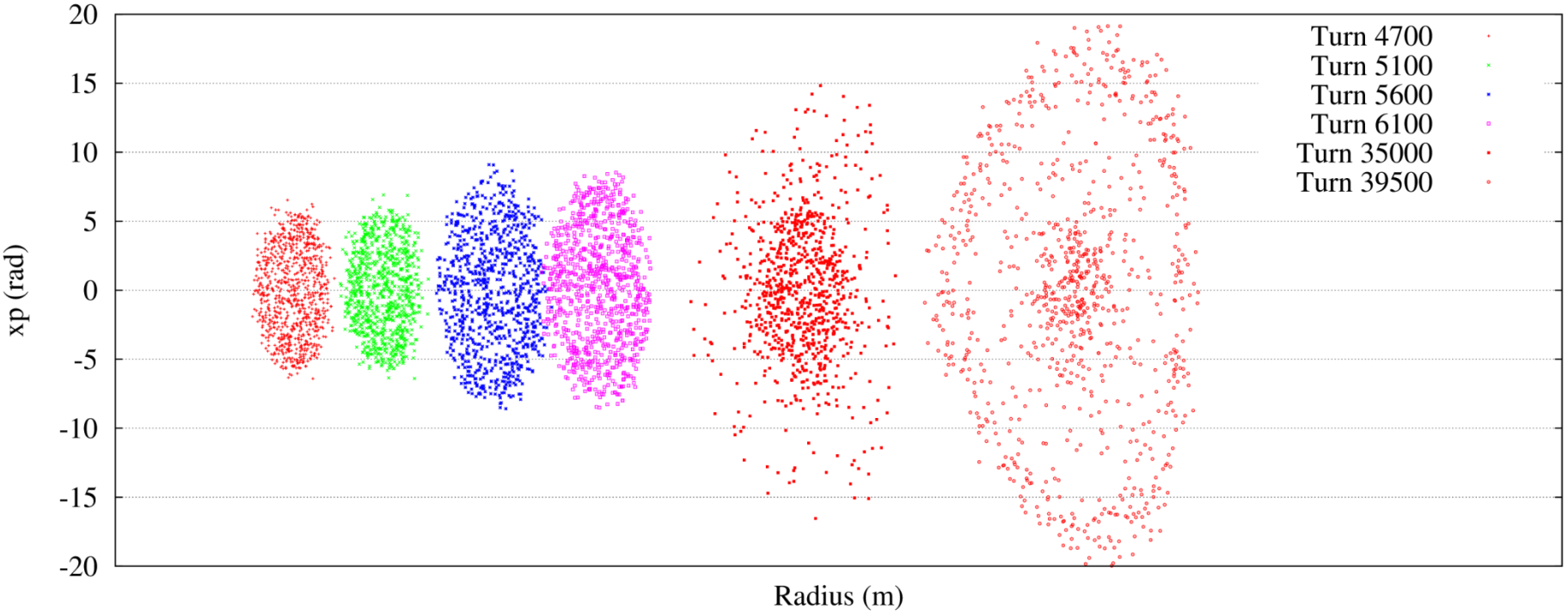
Transverse Phase space



A KV matched beam distribution with 900 particles is generated at injection. It seems to be conserved (only 1400 turns are looked at here).

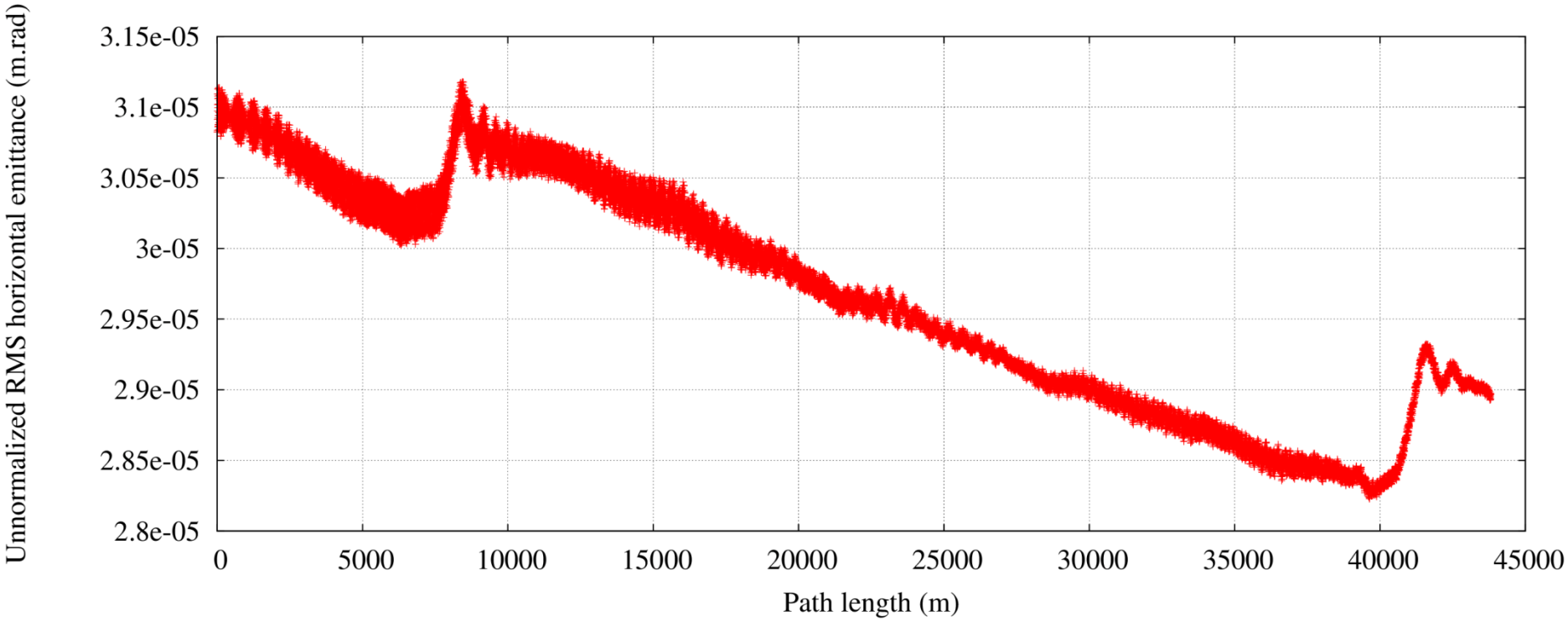
Similar result in the vertical plane.

Phase space evolution



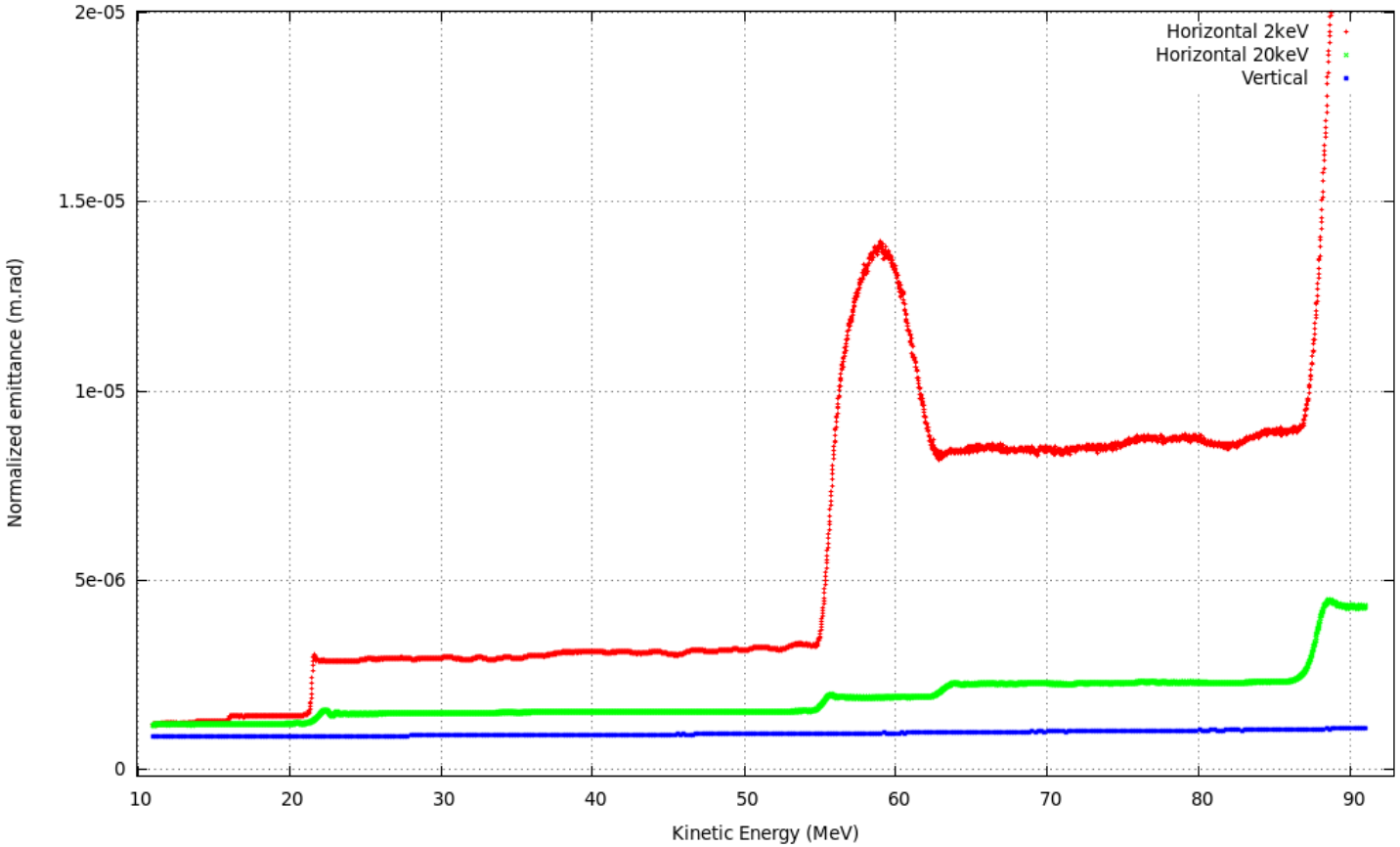
An important change in the horizontal phase space is observed at several locations where the emittance increases considerably.

RMS emittance change in the horizontal plane



The unnormalized RMS emittance in the horizontal plane seems to increase at several locations. Here at ~ 0.1 ms and ~1 ms after injection.

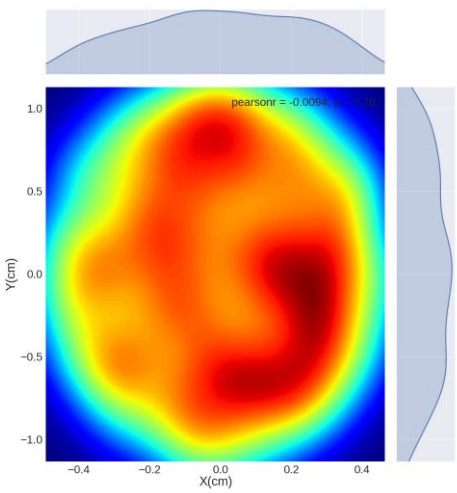
RMS emittance change in the horizontal plane

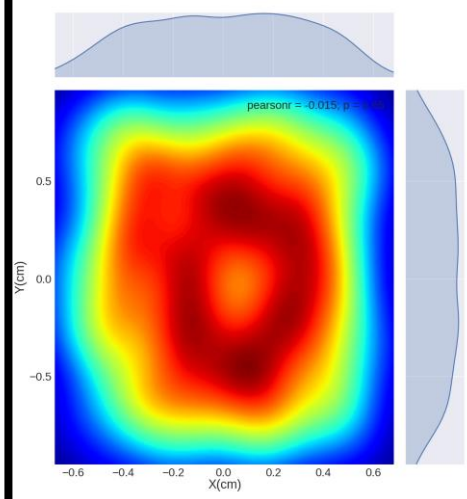


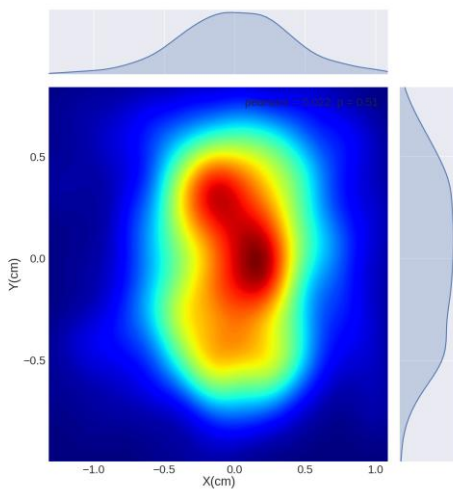
A longer tracking revealed important emittance increase in the horizontal plane. The vertical plane seems unaffected. Benchmarking with SCODE revealed similar results. No explanation yet..

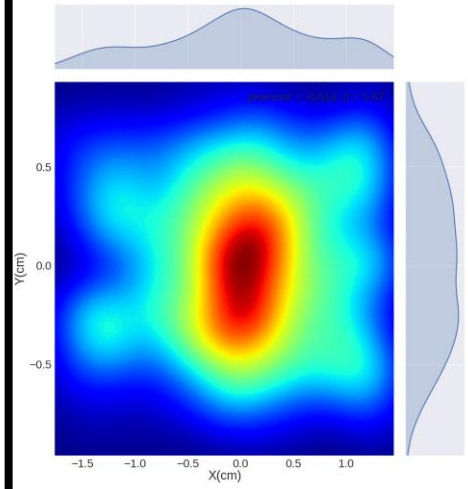
Phase space evolution

X-Y phase space

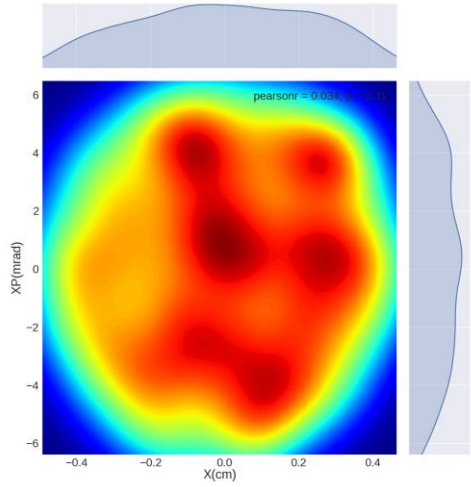


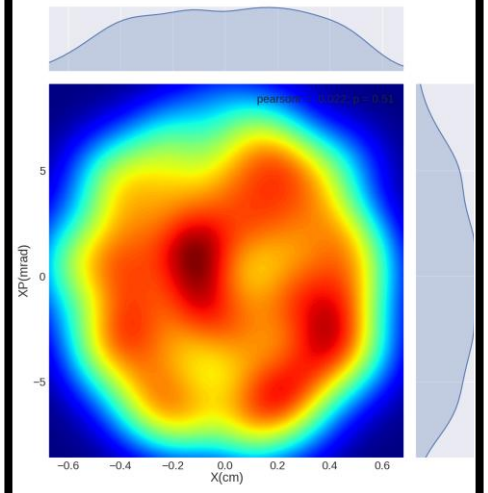


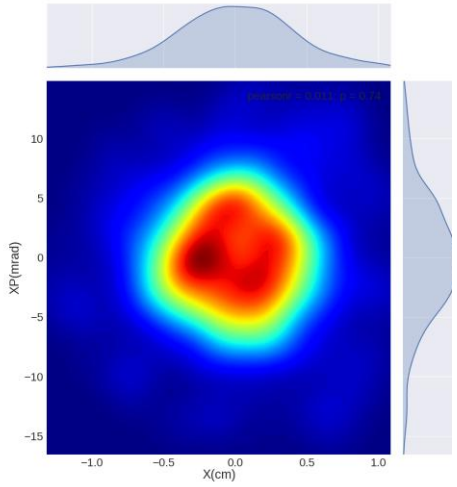


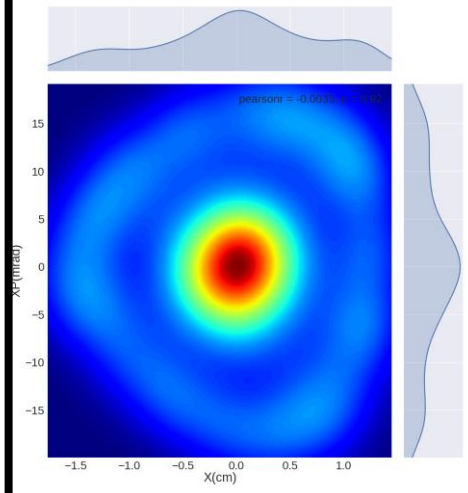


X-XP phase space









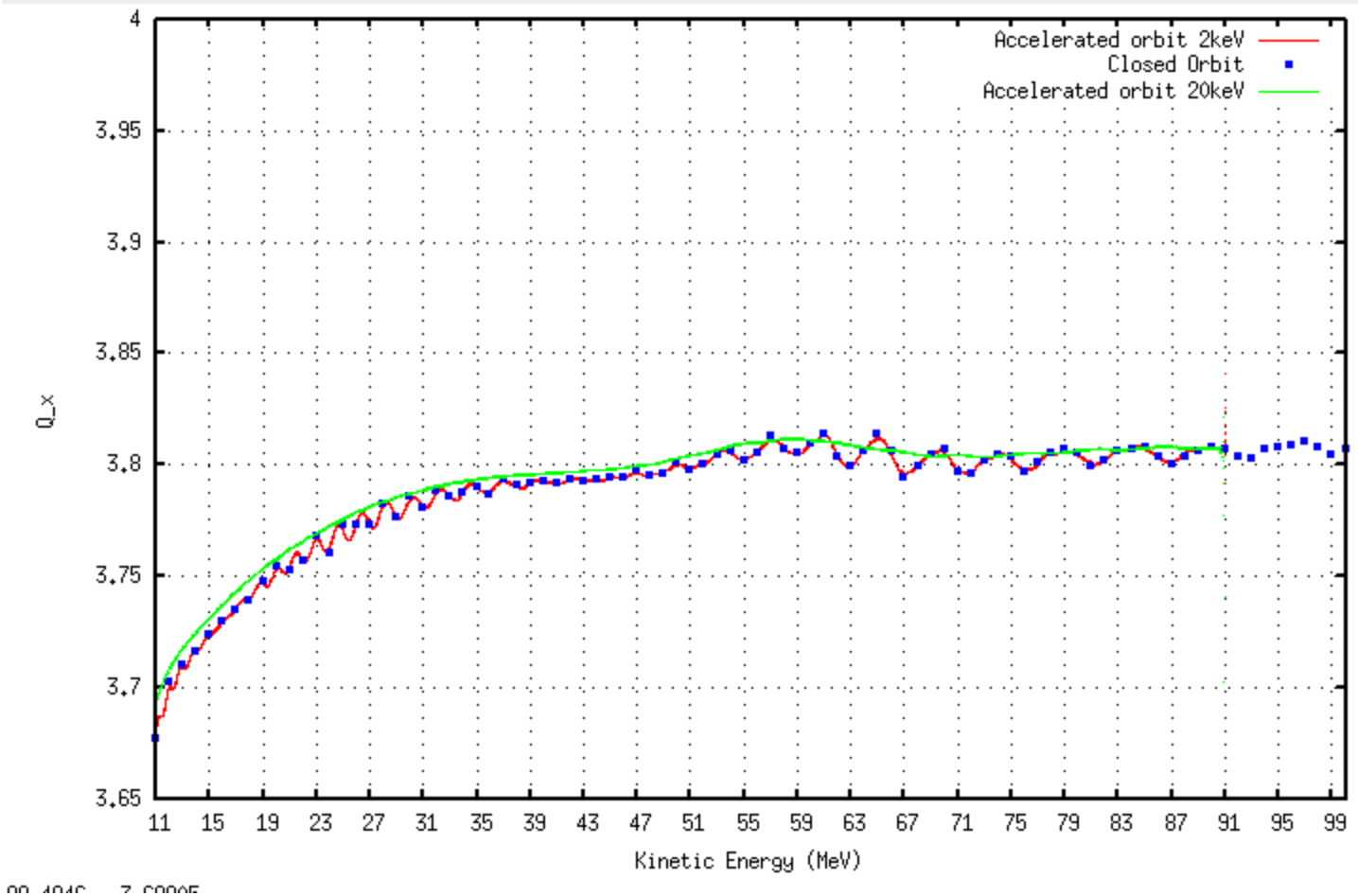
Turn 0

Turn 5600

Turn 35000

Turn 39500

Tune from the accelerated orbit



- No explanation of the rms emittance increase at several locations of the acceleration cycle.
- Resonance crossings may be the origin, however it is surprising that no effect is observed in the vertical plane.
- More results are provided by Shinji-san in his presentation.