Halo generation

G.Cavoto, INFN Roma
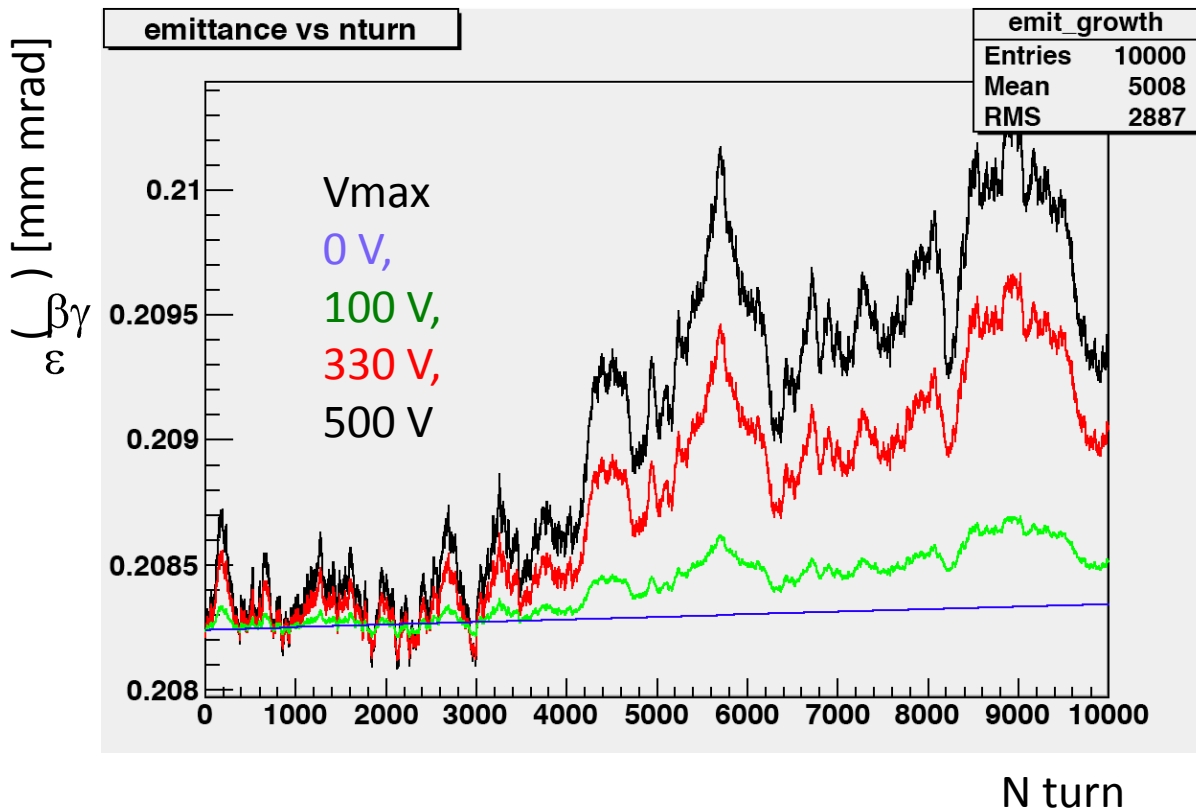
E.Laface, CERN

SPS simulation

- – Linear machine
  - No sextupoles, no octupoles (just switched off...)
- – Particle produced around 6 sigma
  - At SPS begin point
- – Electrostatic dumper ON

- Look at position at crystal location
  - – Either just register position OR absorbe particles
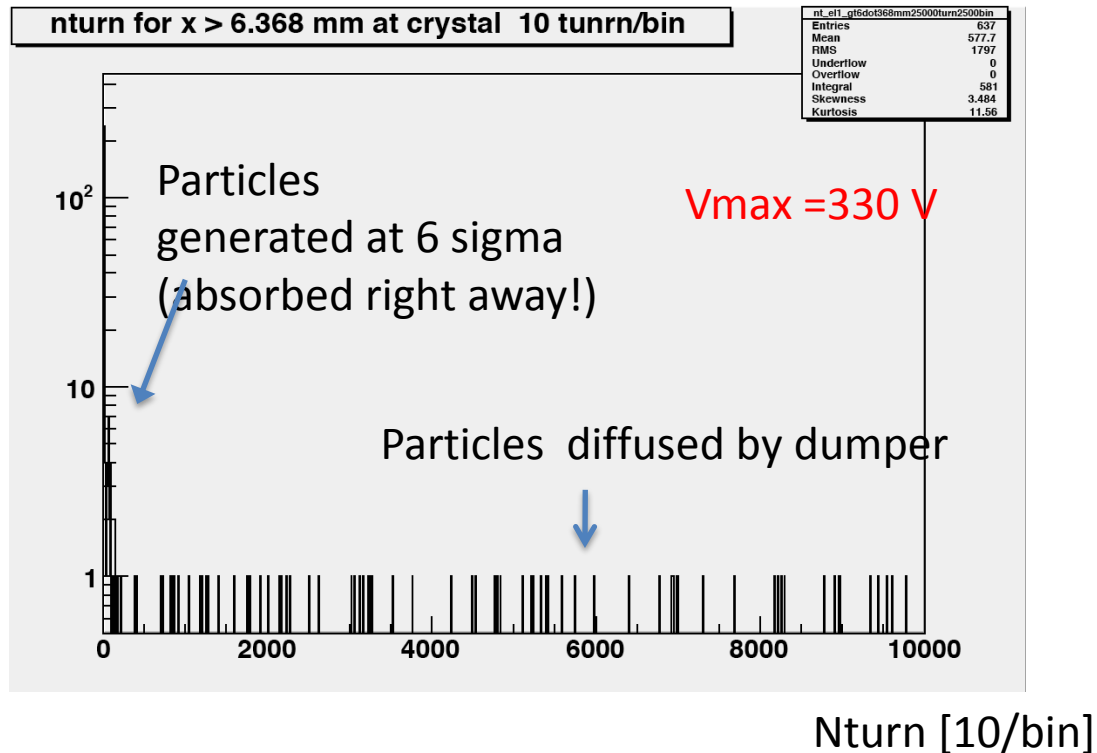
Emittance growth

Evaluated at crystal position

4 different values of Vmax.

Same 1e2 particles propagated for 1e4 turns (also same voltages sequence…)

No interaction at crystal

Absorber at crystal position

- Count how many particle hit the crystal (x>6.368mm) at a given turn.
- Particle removed!

nturn for x > 6.368 mm at crystal 10 tunrn/bin

nt_ei1_gt6dot368mm25000turn2500bin	
Entries	637
Mean	577.7
RMS	1797
Underflow	0
Overflow	0
Integral	581
Skewness	3.484
Kurtosis	11.56

Particles generated at 6 sigma (absorbed right away!)

Vmax =330 V

Particles diffused by dumper

Nturn [10/bin]

Estimating rate of diffusion

- Generated 1e3 particles at 6sigma
- Track particles for 1e4 turns
  - Unless they hit the crystal (absorbed)
  - About half of the particles are absorbed within 100 turns
- Count how many particles hit the crystal between 1000th and 10000th turn

- Estimate rate (SPS rev. freq. 43.4 KHz)

Vmax [V]	Octupole	Rate [Hz]
0	0	0
330	0	310
500	0	460

10% Stat Error.

Generating far from crystal

Generation at	Rate on crystal [Hz] (average over 9000 turns)
6 sigma	310
5.8	310
5.6	650
5.4	50

Clearly moving away from crystal you need more time
 to see diffusion onto the crystal (need to track particles for more time)

Try to extrapolate the total rate …

Plans

- Evaluate emittance increase with octupole on
  - First indication at low stat show small differences…

- Phase space distribution at crystal