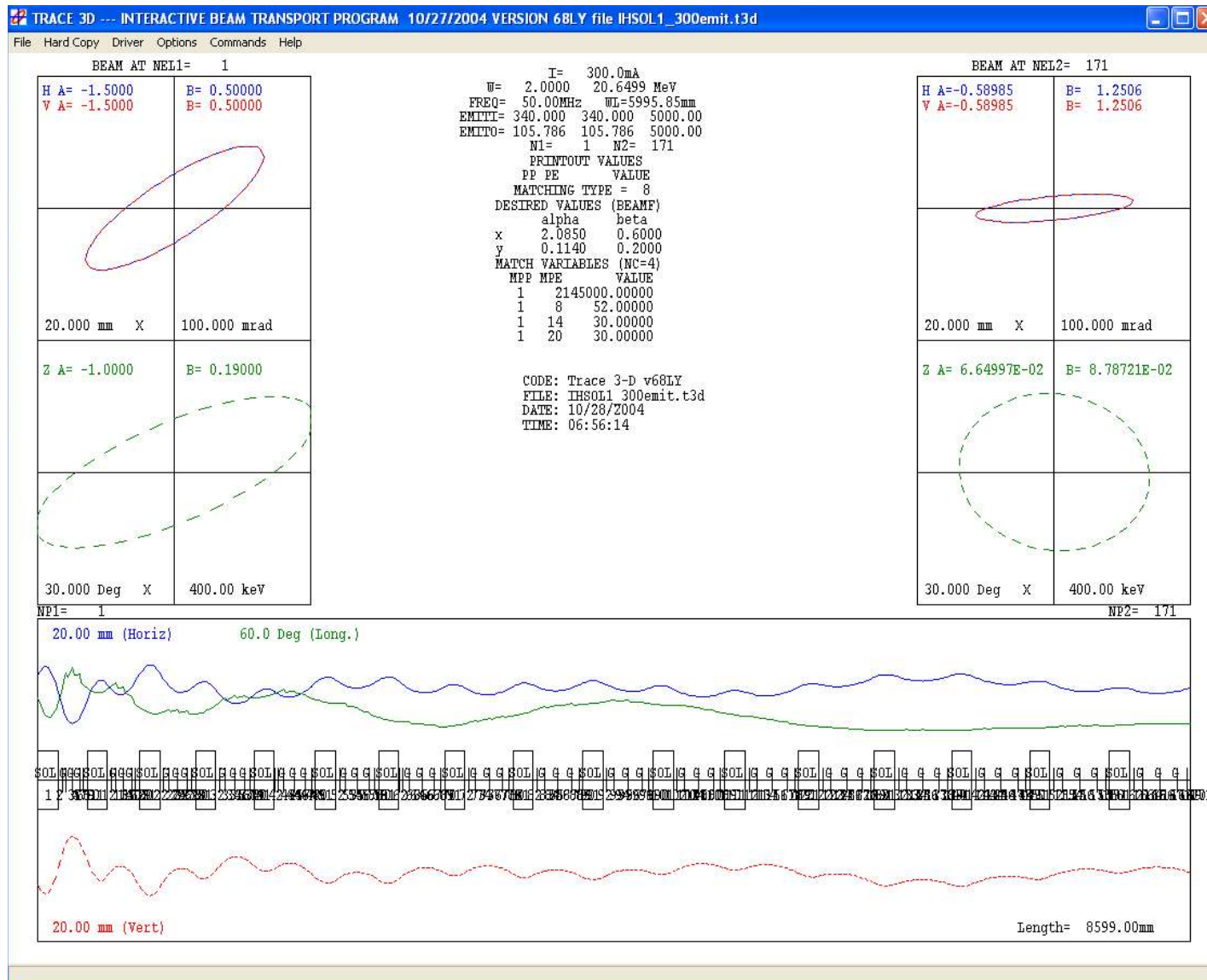


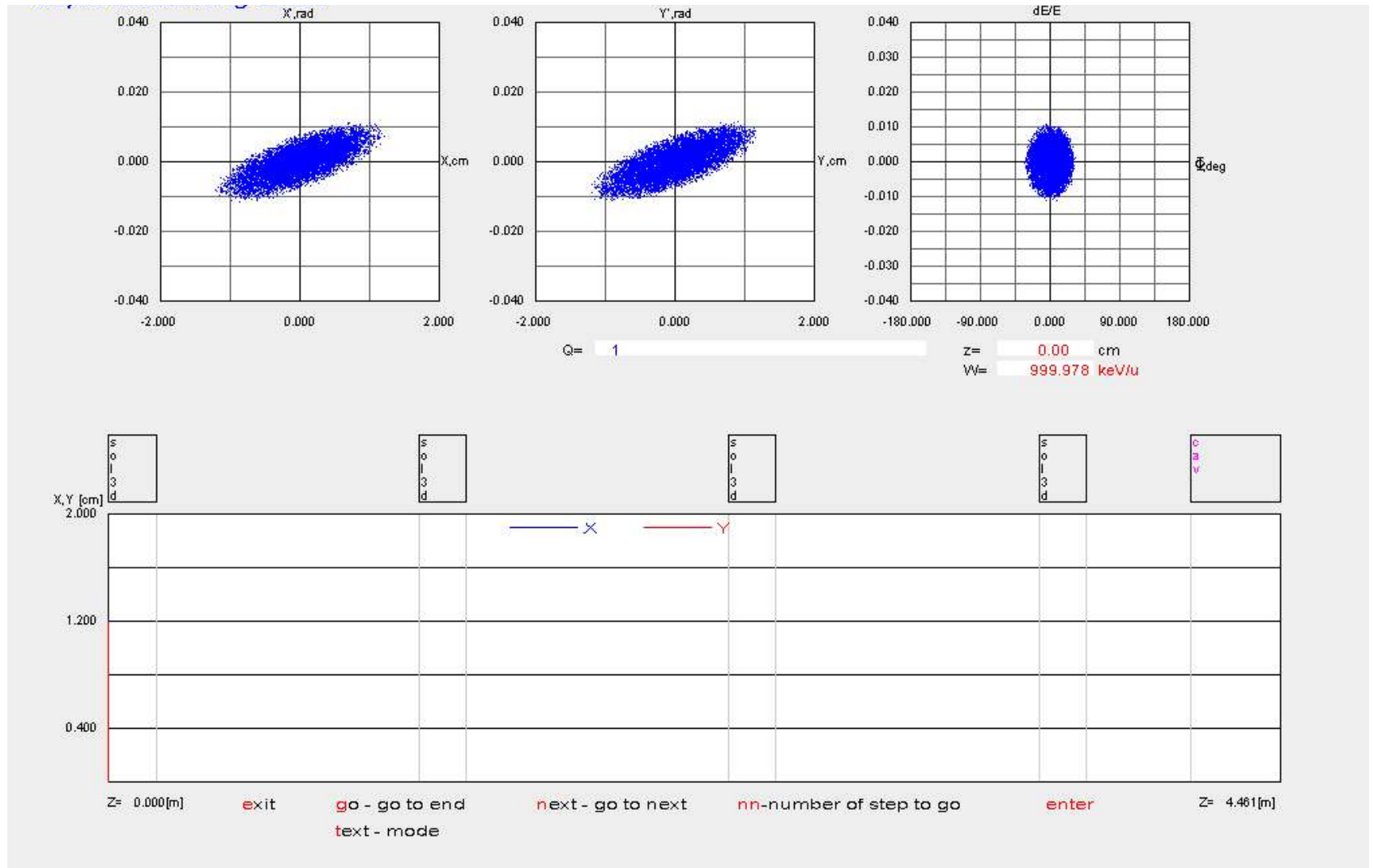
TRACE 3D simulations of the Linac

Beam	Ne ¹⁺
Input energy	2 MeV, 0.1 MeV/u
Output energy	20 MeV, 1 MeV/u
Current	300 mA
Frequency	50 MHz
Length	8.6 m
Number of resonators	17
Voltage per gap	400-500 kV
Field in the solenoids	15 Tesla
Eff. Length of the solenoids	15 cm

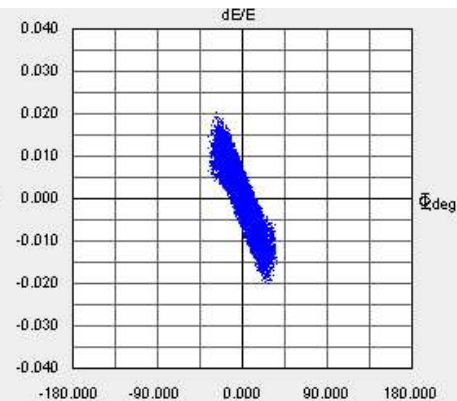
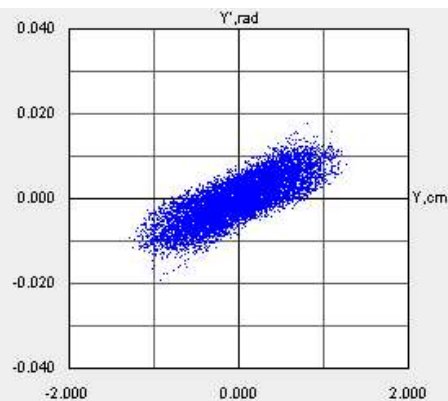
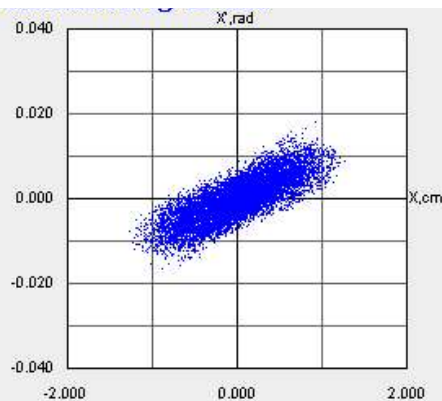
TRACE 3D simulations of the Linac, 300 mA



Beam simulation in the debuncher

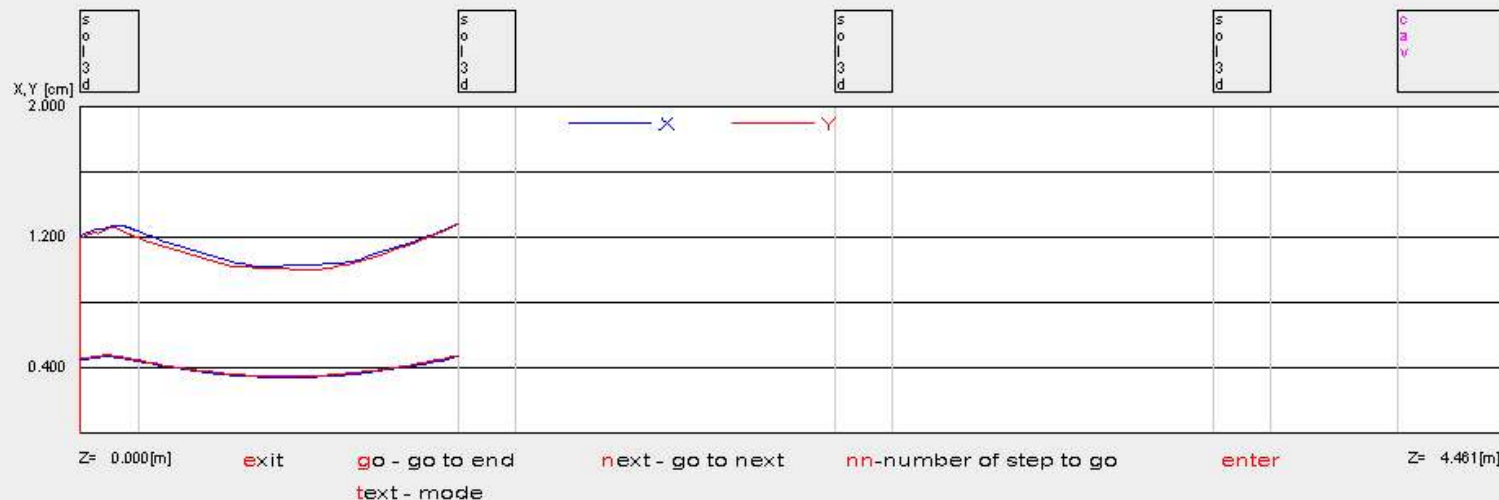


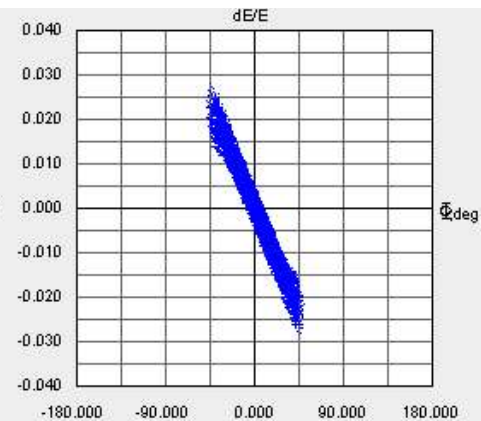
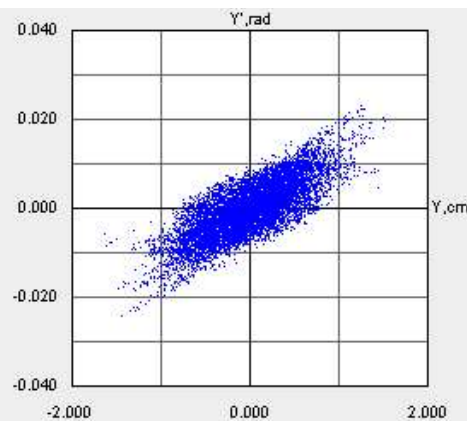
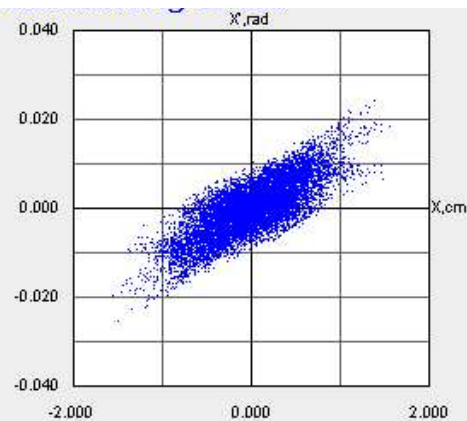
Exit of the Linac, 20 MeV Ne¹⁺ , 1 MeV/u, 300 mA



Q= 1

Z= 118.10 cm
W= 999.973 keV/u

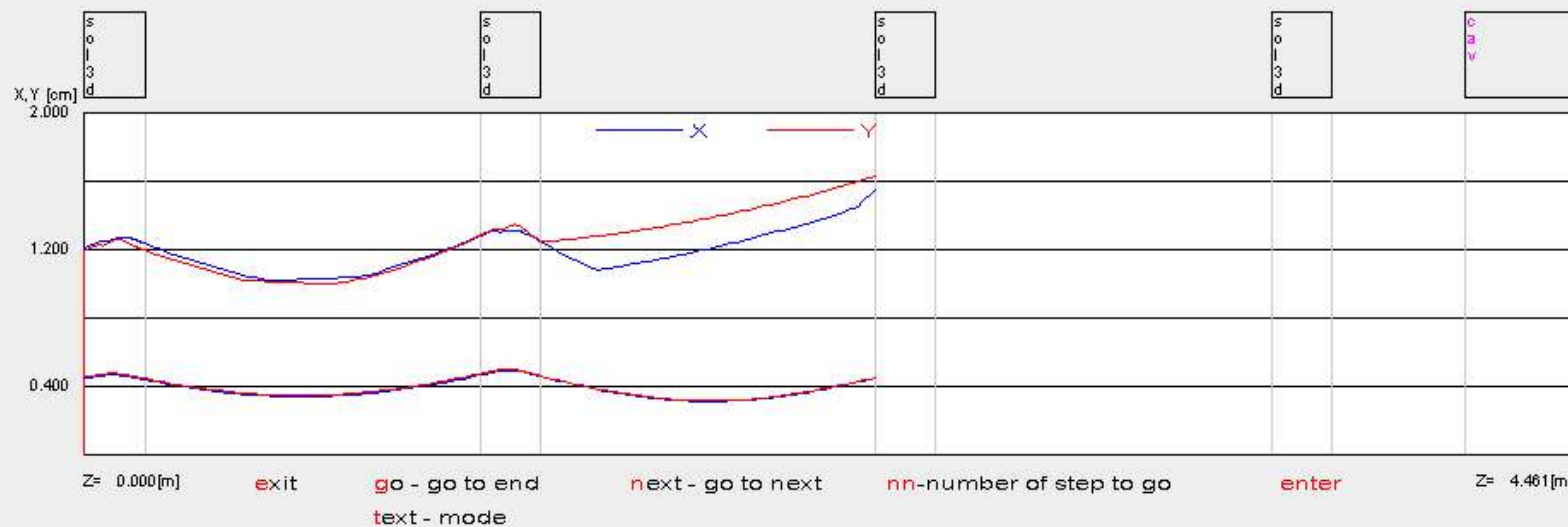


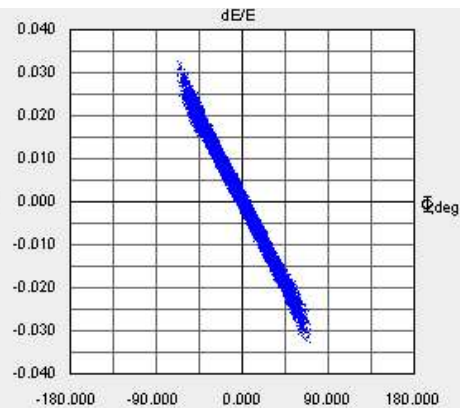
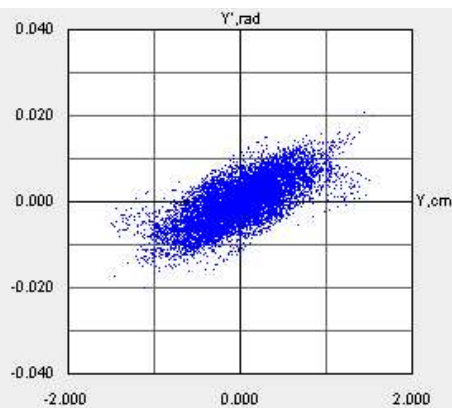
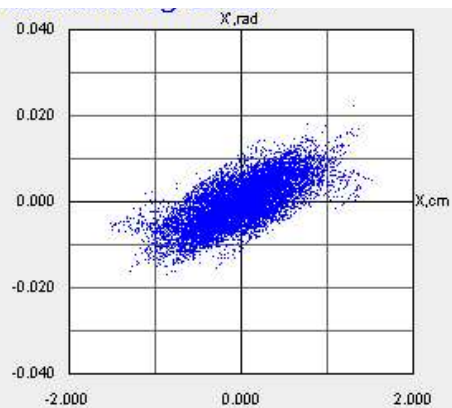


Q= 1

z= 236.10 cm

v= 999.955 keV/u

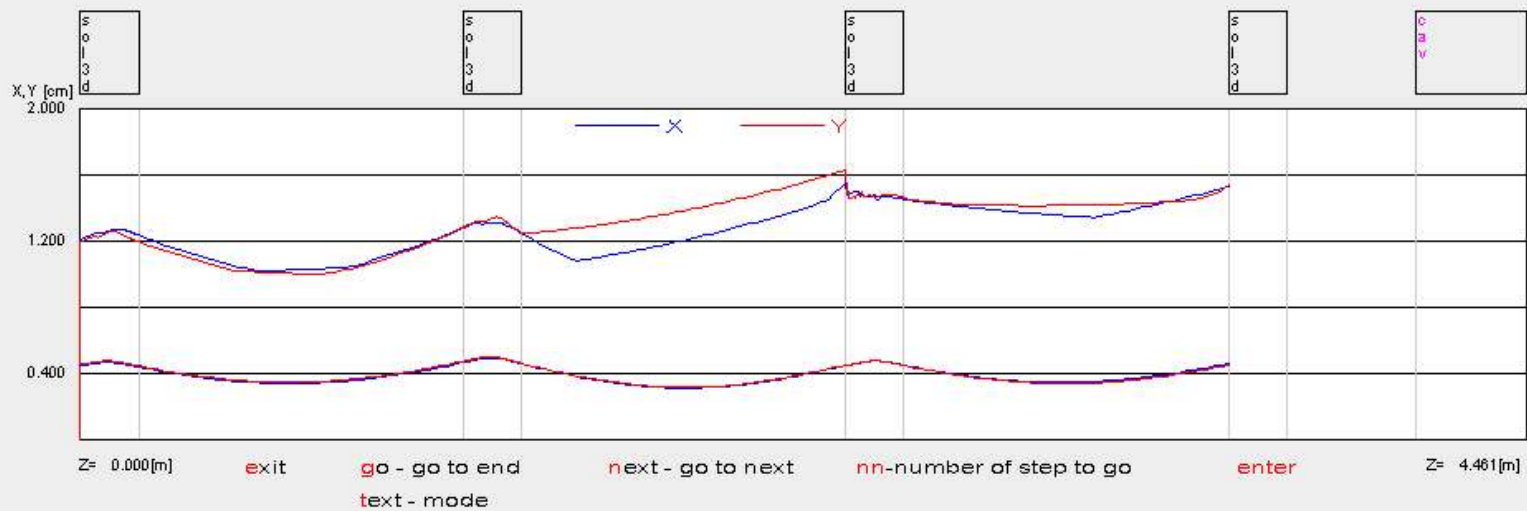


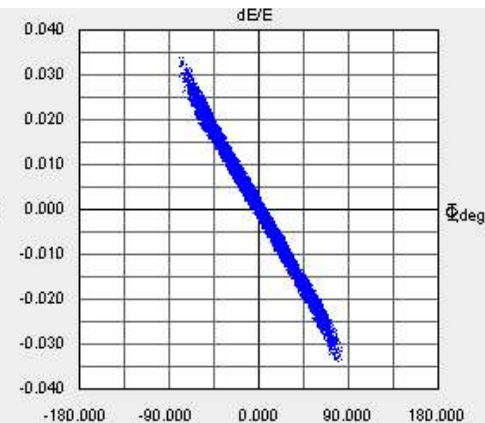
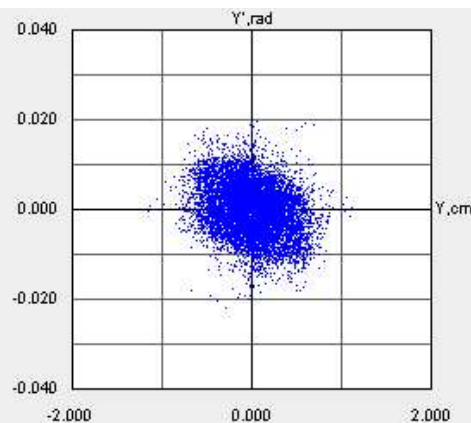
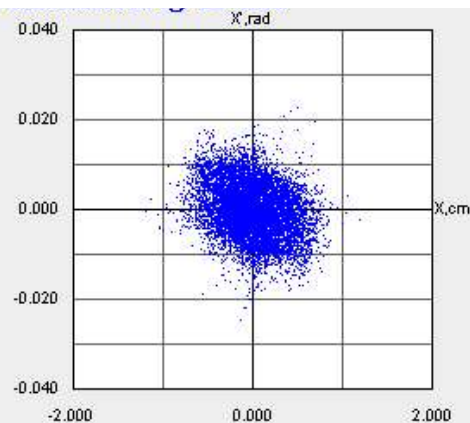


Q= 1

z= 354.10 cm

v= 999.940 keV/u

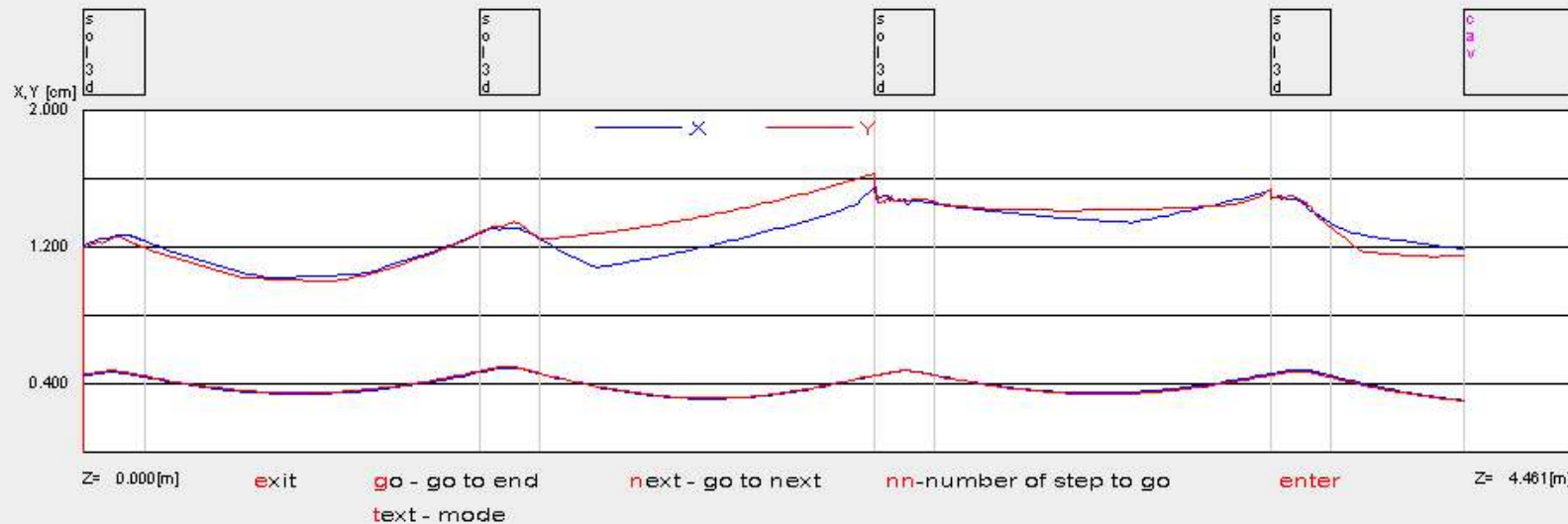




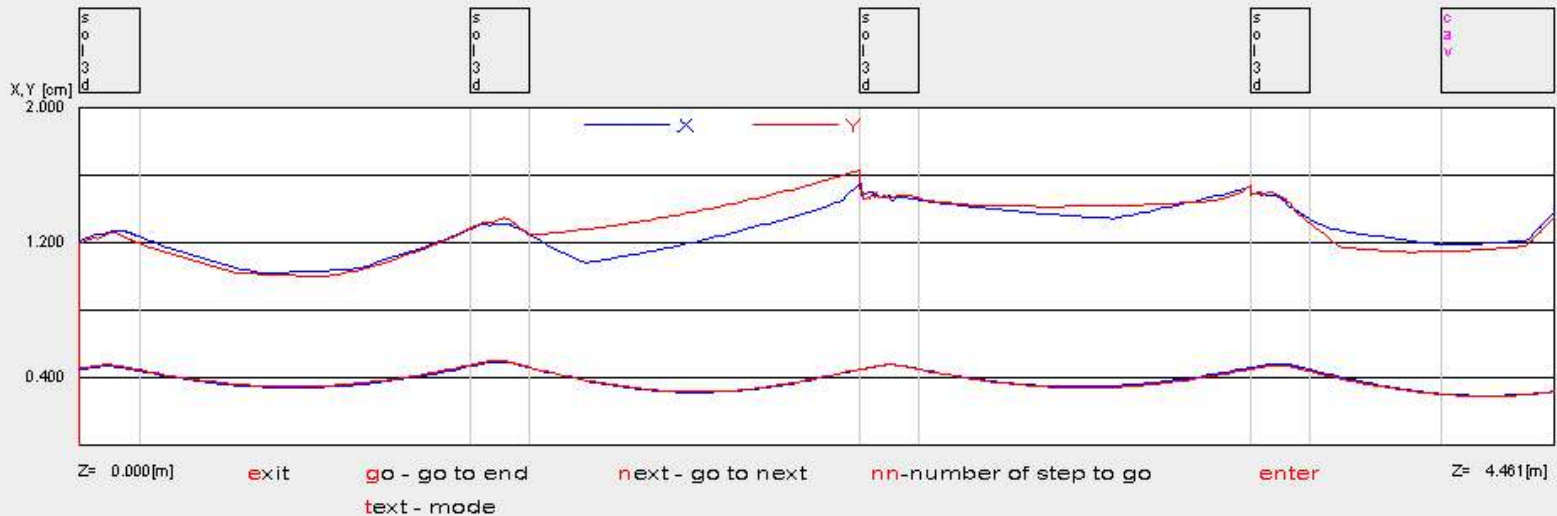
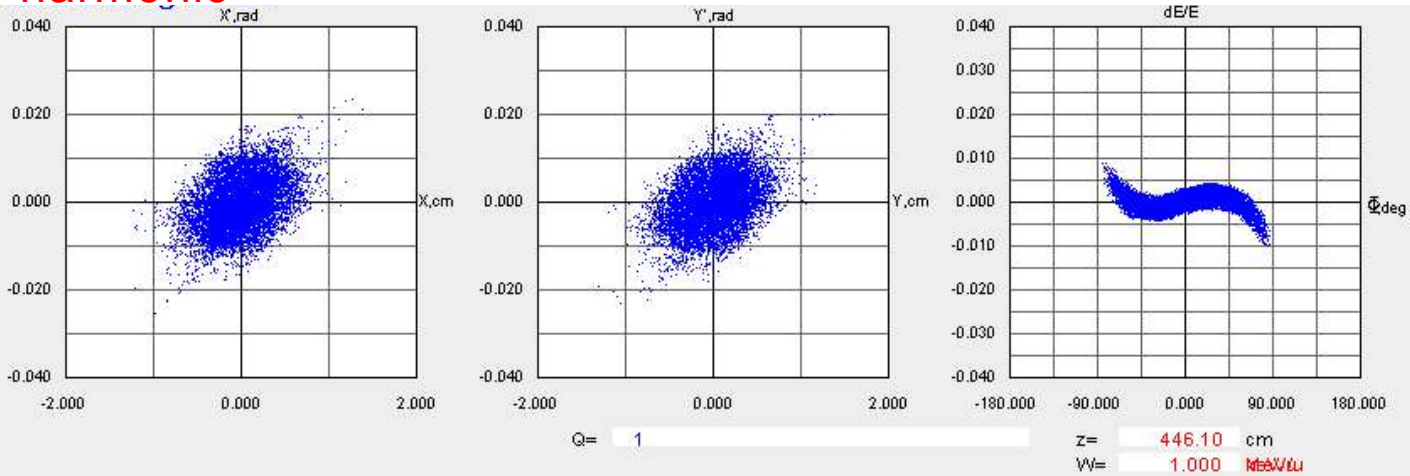
Q= 1

z= 412.10 cm

v= 999.919 keV/u



Non-linear effect can be cancelled by applying second harmonic



Length of the debunching drift is 4.5 m

Debuncher cavity

- Necessary to compensate longitudinal defocusing due to space charge
- Reduces energy by a factor of 2.2
(by a factor 7)
- Can be improved using higher harmonics

Velocity modulation

$$\Delta t(LL, k) := \frac{LL}{c} \cdot 10^6 \cdot \left(\frac{1}{\beta_2(k)} + \frac{-1}{\beta_1(k)} \right)$$

$$\beta_1(k) : \beta_0 \cdot (1 + k)$$

$$\beta_2(k) : \beta_0 \cdot (1 - k)$$

Black – 10 m
Blue – 20 m
Red – 40 m

