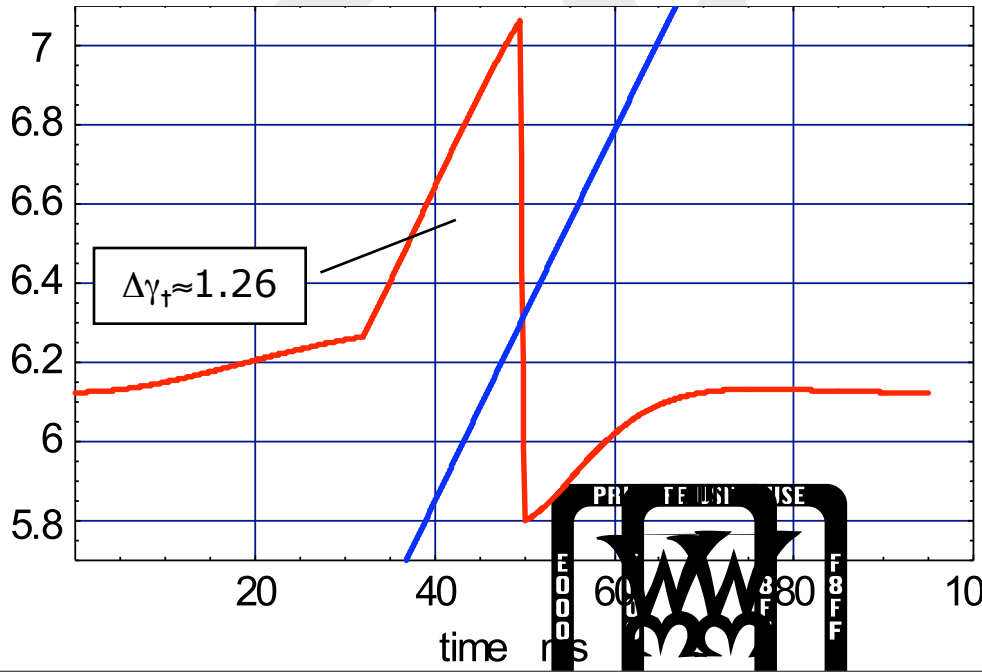
Aim: Reduce the beam losses at the transition time using the Gammajump in the PS

Compromise between the following contrains at the transition time:

- $|\eta| \leq 0.004$ less than 1 ms
- Zero Tune shift or the smallest possible (not considered in the study)
- The best Jump quality as possible, i.e $\Delta\gamma_{tr} \approx 1$ as large as possible in order to stay far from the instability zone, the transition
- Be careful of the losses in section 63



(From M. Martini, APC)

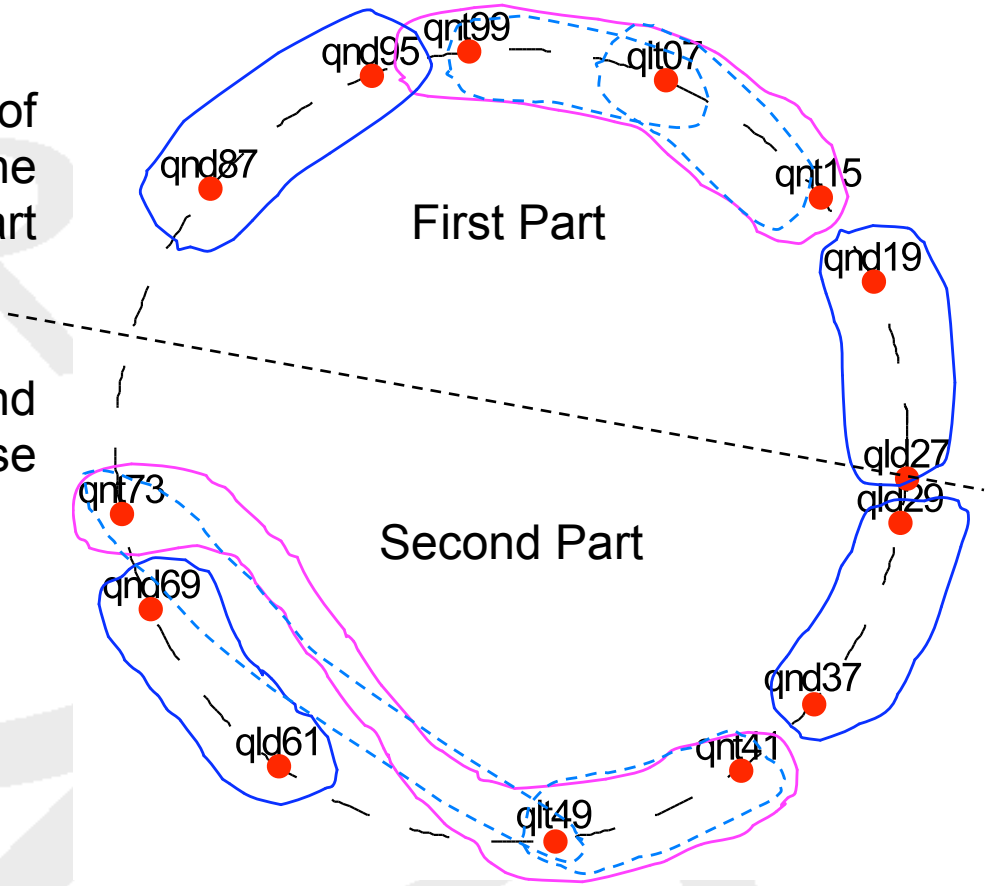
- Results of the sensitivity study

Increase the current in the first part of the Ps machine and decrease of the same quantity in the second part (section 63)

Increase the current in the second part of the Ps machine and decrease of the same quantity in the first part

Which influence do the doublet and the triplet have on the envelope?

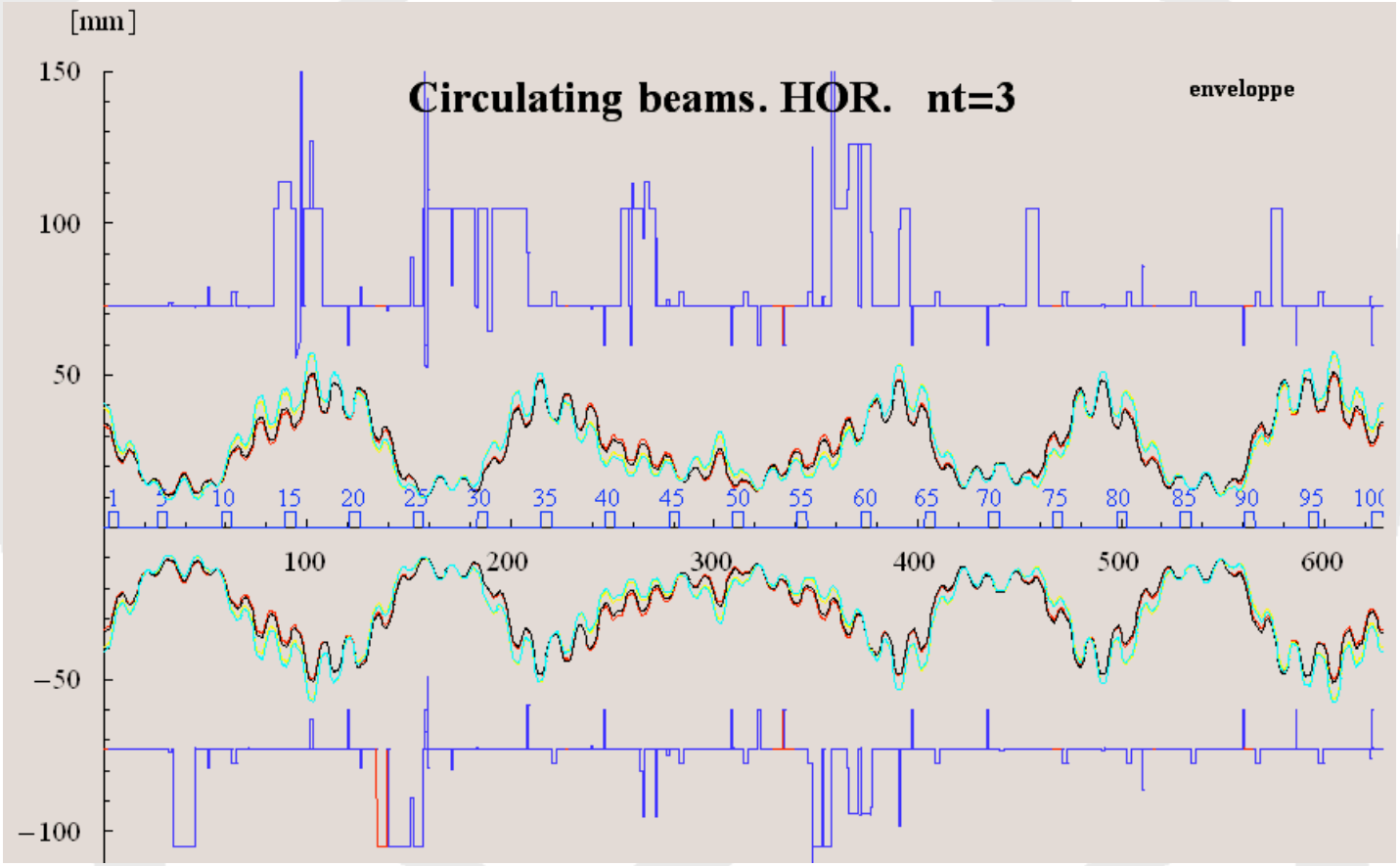
Doublet and Triplet Magnets in PS machine



- Final specifications of the doublet and triplet currents

(From M. Martini, APC)

Doublet and triplet influence on the envelope – Results of the sensitivity study of increasing currents in the first part of the machine



No significant influence of the doublet on the envelope, contrary to the triplet

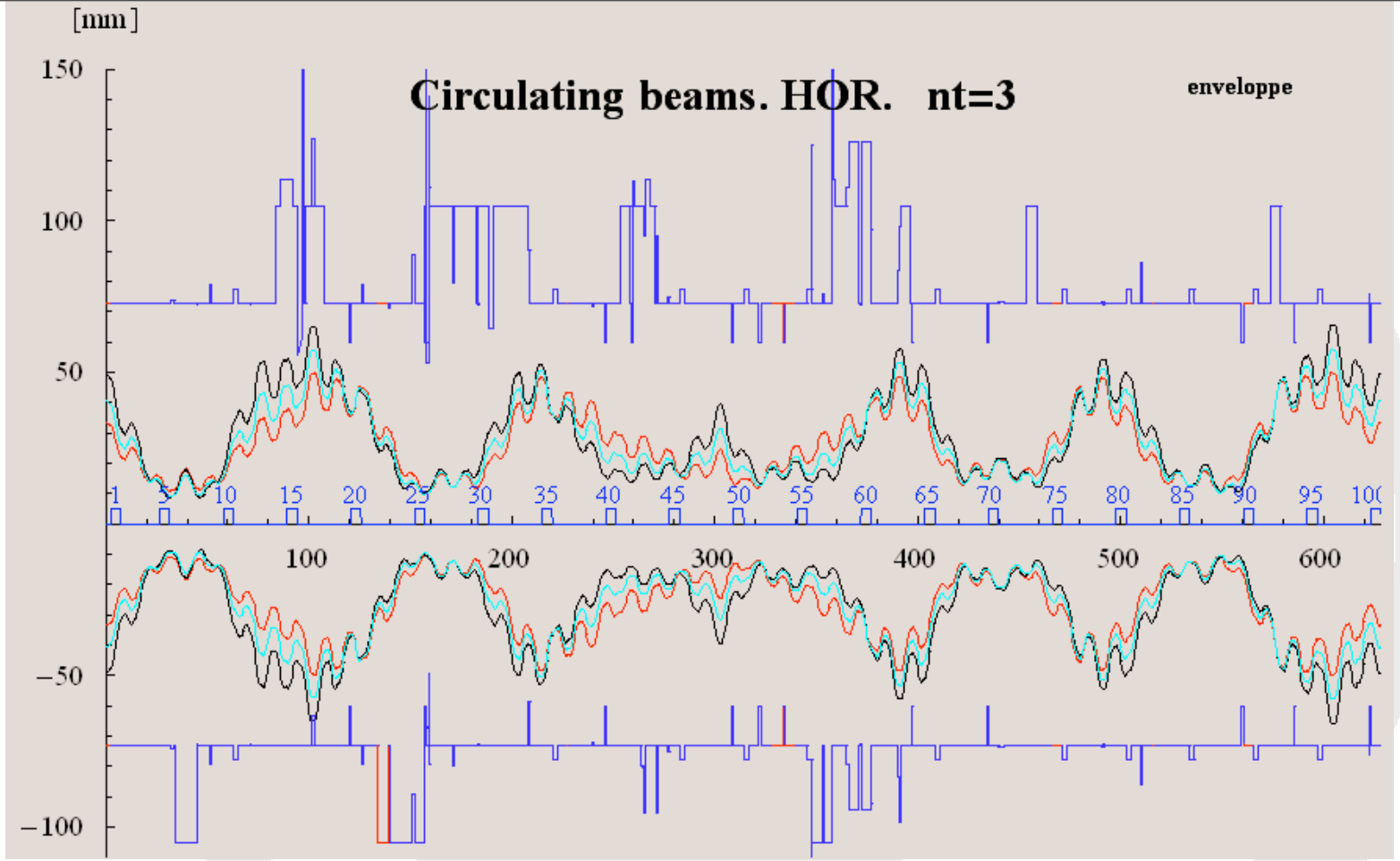
A priori no reduction of the envelope in this configuration of power supply

Red: normal machine

Black: +15% of the doublet currents only

Yellow :+15% of the triplet currents only

Cyan: 15% of both



Red: normal machine – Black: +30% both – Cyan:+15% both

$$Envelop = \sqrt{9\beta\varepsilon + 4\left(\frac{\Delta p}{p}.D\right)^2}$$

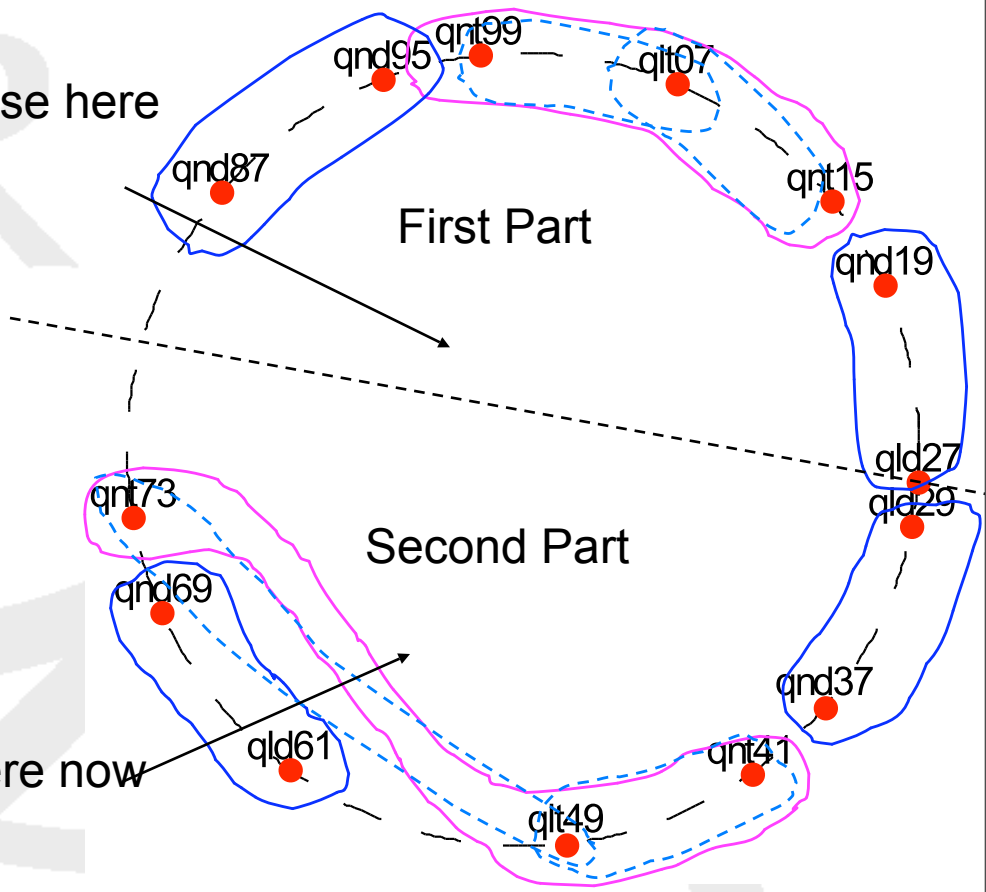
Increasing currents in this configuration → β decreases

Dispersion rises

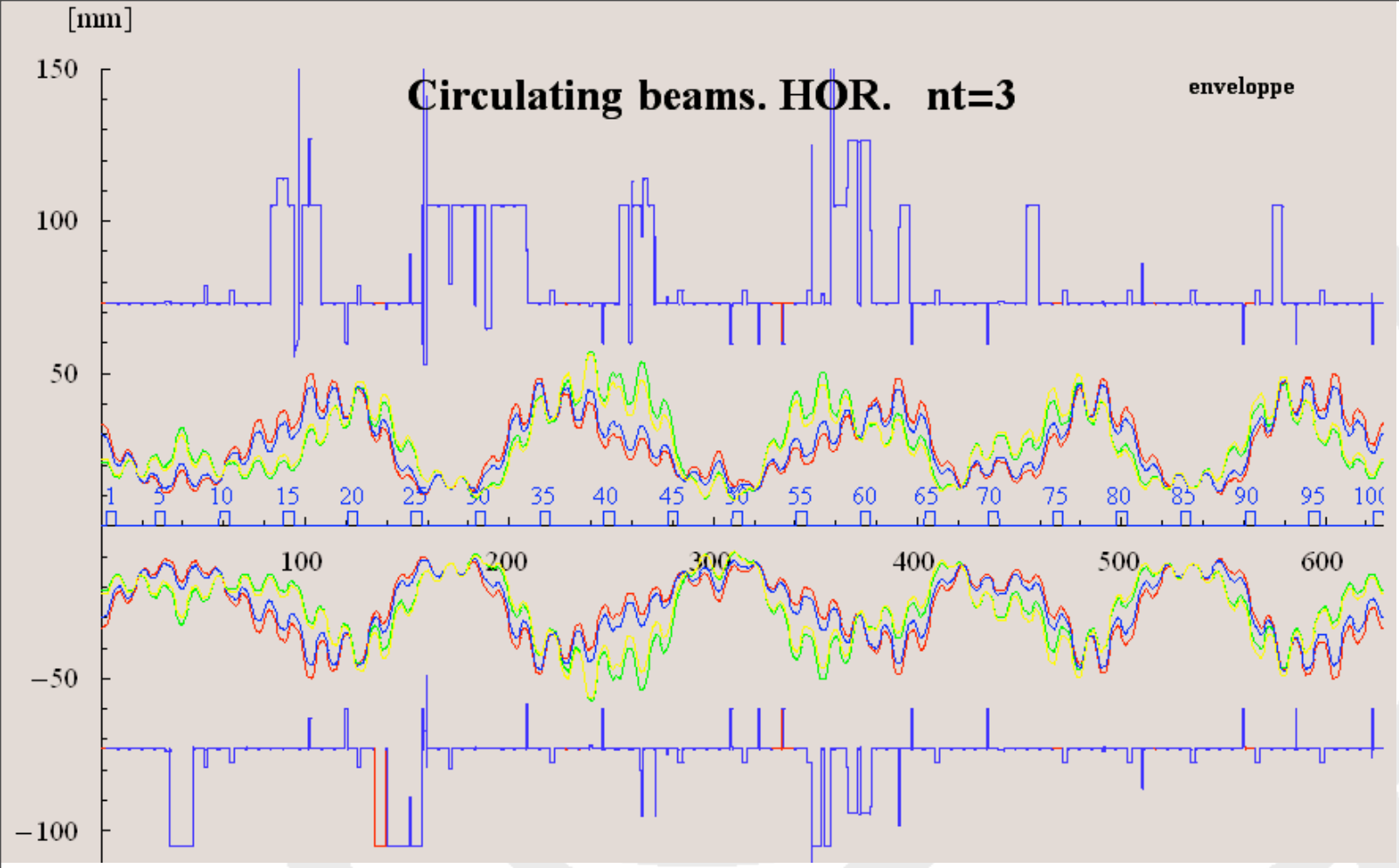
Increase of the envelope if the currents, particularly the triplet current, are raised in the first part of the PS machine because of the Dispersion function

Currents decrease here

In the following study, currents increase in the second part of the machine (section 63)



Currents rise here now



Red: normal machine – Blue: +10% triplet – Yellow: +40% triplet - Green: +40% both

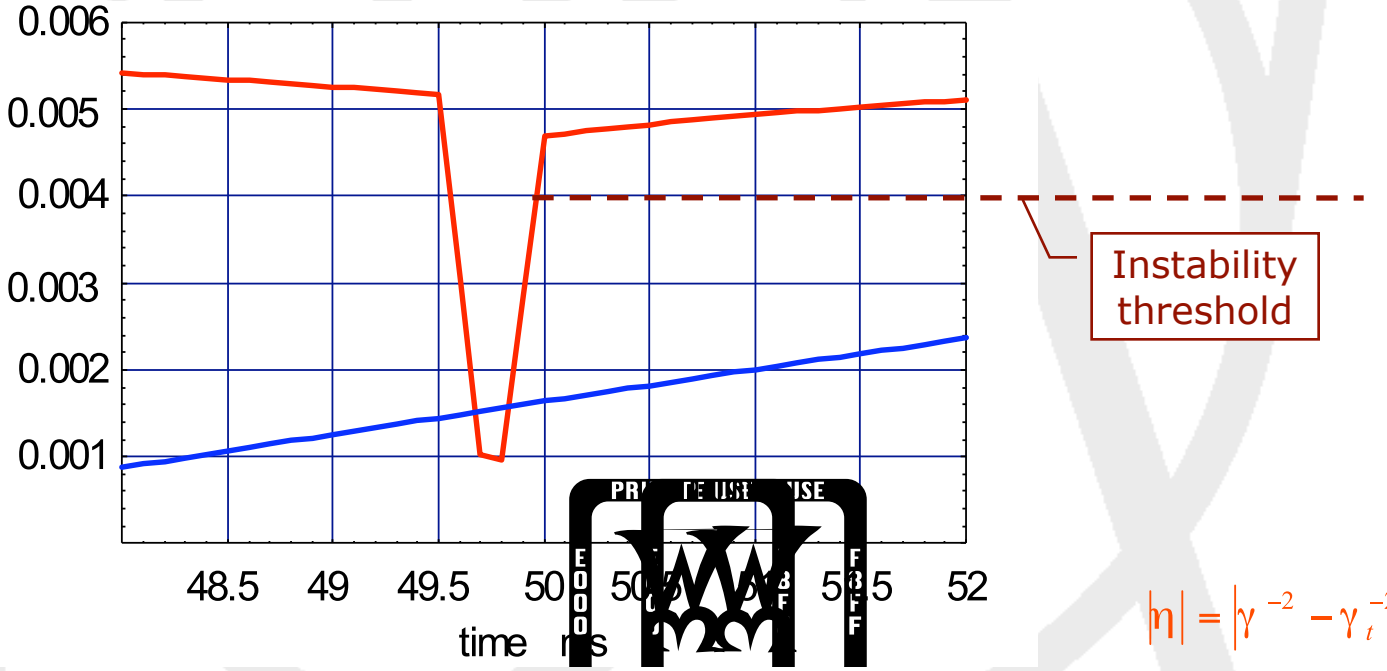
No decrease of the envelope, but the peeks moved toward sections where the apertures could be larger

Limit of the current increases +40% in the triplet or for both

Check if the function η fulfils condition

Present quadrupole layout

Zoom of η plot vs time

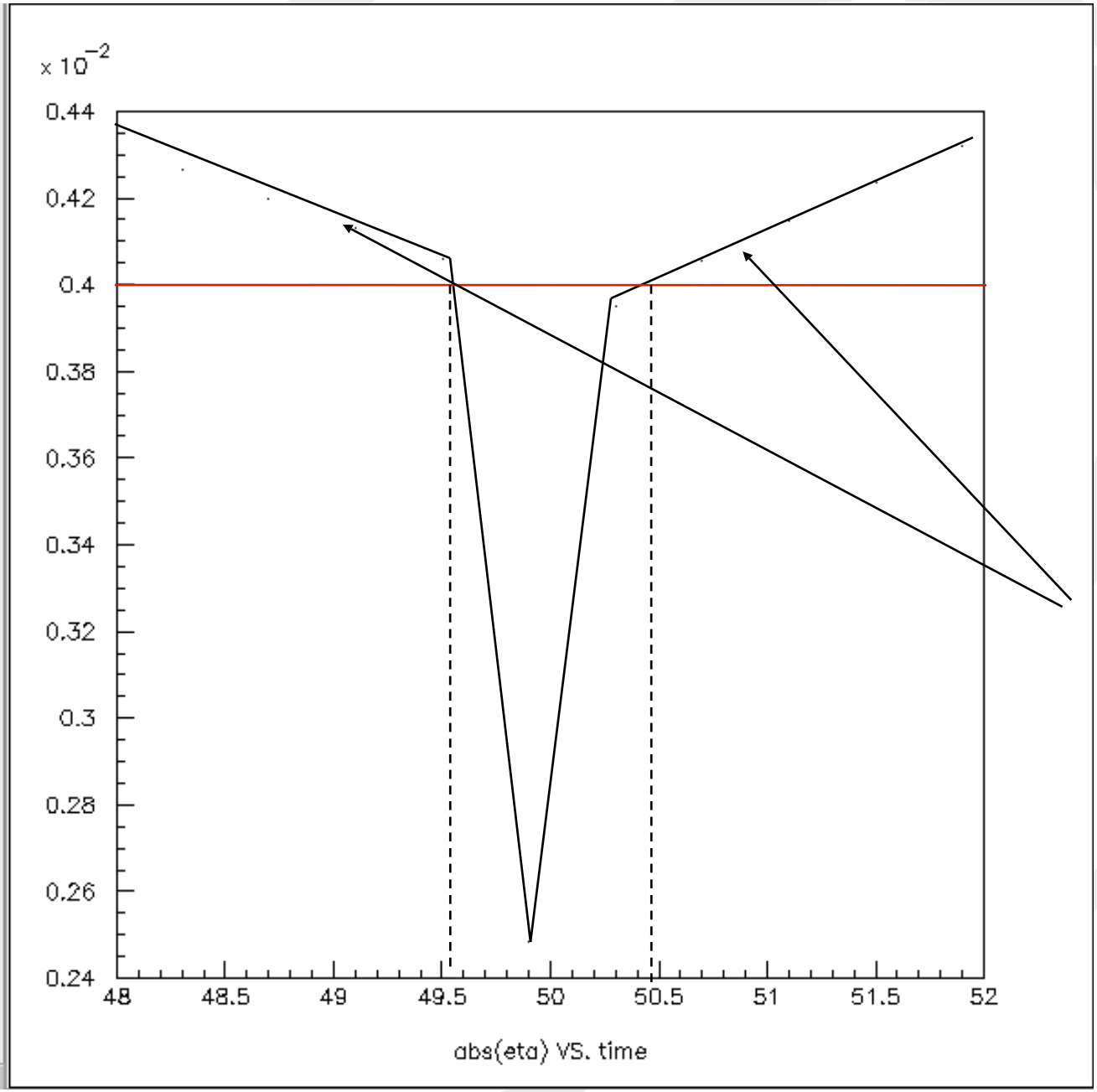


$$|\eta| = |\gamma^{-2} - \gamma_t^{-2}|$$

Below an increase of 40%, the condition |η| ≤ 0.004 less than 1ms is not fulfilled

Instability risk

(From M. Martini, APC)



+40% of the triplet in the second part of the machine

Less than 1 ms

+40% in doublet and triplet currents

Less than 1 ms

Final wish for the Power Supply would be this case, however magnets could be not fitted for such high current. (to check)