Impact on luminosity of Turn-around time, Run time etc.
Definitions (reminder…)

$$\tau_{\text{eff}} = \frac{N}{L_0 \sigma n_{\text{IP}}}$$

Case of no Levelling

Luminosity evolution

$$L(t) = \frac{\hat{L}}{(1 + t / \tau_{\text{eff}})^2}$$

Average luminosity

$$L_{\text{ave}} = \frac{\hat{L}}{(\tau_{\text{eff}}^{1/2} + T_{\text{ta}}^{1/2})^2}$$

Optimum $T_{\text{run}}$

$$T_{\text{run}} = \sqrt{\tau_{\text{eff}} T_{\text{ta}}}$$

Cf. F. Zimmermann – Chamonix 2011
Observations:
- $T_{ta}$ is the main factor for a high average luminosity
- Case 1: if $T_{ta}$ has to be in the range 4-5 h, $T_{run}$ has small impact
  $\Rightarrow$ a low $T_{run}$ can be used
  $\Rightarrow$ small dynamic range in $L$: need for levelling?
- Case 2: if $T_{ta}$ can be made small (2-3 h), $T_{run}$ shall preferably be small
  $\Rightarrow$ small dynamic range in $L$: need for levelling?
Conclusions

• Working on the reduction of $T_{ta}$ will be highly rewarding (2-3 h ?)

• $T_{run}$ does not need to be very long (4-5 h is fine)

• The dynamic range in luminosity will not exceed a factor of 3: does it justify levelling?

• A small $T_{run}$ (4 h) is compatible with a moderate intensity ($4 \times 10^{14}$ p)...