Updates on Final Cooling

Cooling Working Group meeting, 26.01.2023

Bernd Stechauner

Free parameters

Absorber length

Initial Energy

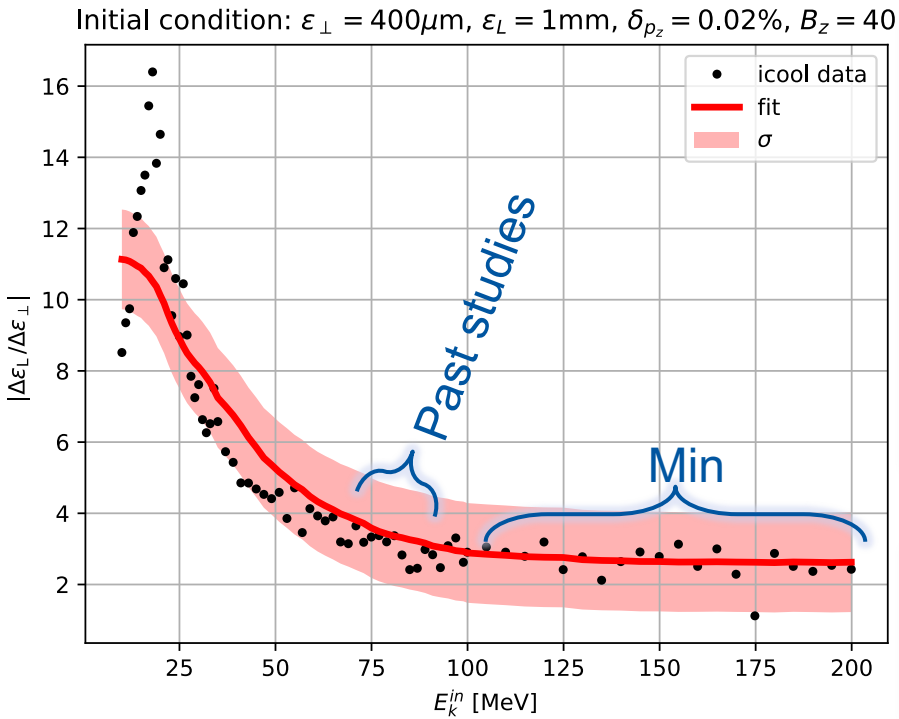
Energy spread

$$\min \frac{\Delta\epsilon_{L,N}}{\Delta\epsilon_{\perp,N}}$$

$$\max \mathcal{L} \propto \frac{1}{\epsilon_\perp \cdot \epsilon_L}$$

Find the perfect recipe

Effective cooling investigations



Initial conditions

- Varying initial **energy** (10 – 200 MeV)
- All beam parameters are **constant**
- Beam ellipse always matched to solenoid-machine ellipse
- Decelerate **10%** in **LH** energy down
  - e.g.: 100 MeV -> 90 MeV
- **Decay** not included !!!

Result

- **Minimum** in the higher energy range (> 100 MeV)

Next steps

Conclusion:
Example shows: Luminosity increases at higher initial energies

To do :

- Continue these simulations and also vary the trans emittance
- Study the simulations' minimum $|\epsilon_L/\epsilon_\perp|$ behaviors

Discuss the results in our next meeting


CERN