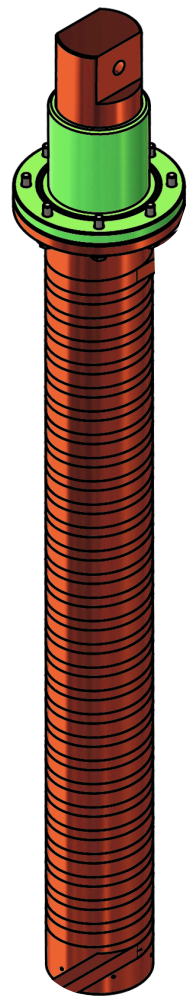


Energy efficiency and stability of accelerator systems

Prof. Steffen Grohmann

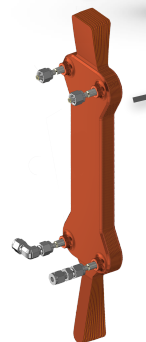
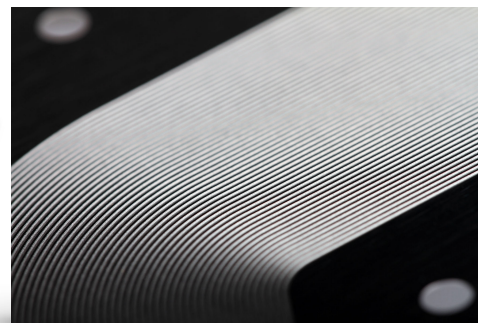
Two project proposals

1) Ultra-compact current leads



Example: 10 kA

Classical design
 $L \approx 1$ m



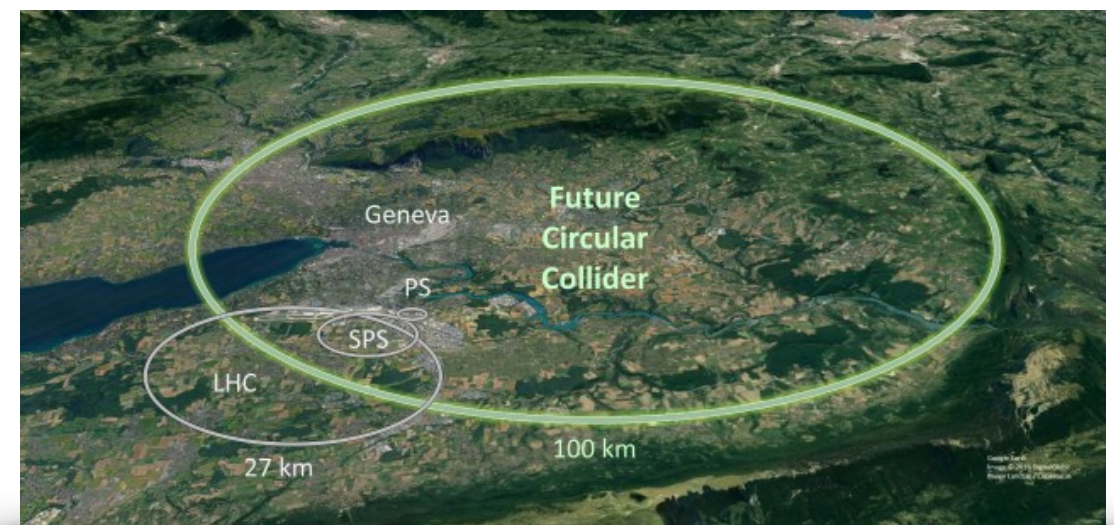
Micro-structured with
CMRC-cooling
 $L \approx 0.2$ m

Efficiency:
$$\frac{P_{\text{Micro,CMRC}}}{P_{\text{Classic,GM}}} \approx \frac{1}{3}$$

2) FCC real-time digital simulator



Digital twin, energy management



Energy efficiency & stability of accelerator systems

■ Background

- The realisation of future particle accelerators is closely linked to a **broad engineering development of new technologies and methods**
- One key aspect of future particle accelerators is the **growing complexity** to reach **maximum availability** and **operational stability**

■ Objectives

- 1) New technology application of **ultra-compact/efficient micro-structured current leads** for **HTS** and **LTS magnet systems**
- 2) **Stability of electrical networks** for large-scale infrastructures

■ Partners: CERN, KIT-ITTK, KIT-ITEP

■ Future partners: Magnet systems?, Specific application at CERN and/or ...?

■ Resources

- 1) 1 FTE 36 months (100 %), 20 k€ travel, 250 k€ invest
- 2) ...

■ Contact

- 1) KIT-ITTK (Prof. Steffen Grohmann)
- 2) KIT-ITEP (Prof. Mathias Noe, Giovanni De Carne)