



Contribution ID: 13

Type: **not specified**

Cryocoolers technologies

Thursday 12 June 2025 16:30 (1 hour)

About the lecture:

The course will give a brief introduction to the cryocooler principles and its main components, which is required to understand the interaction of the cooling source with the cooling object in question. The first part will cover a recap of the cryocooler principle for JT, Stirling, GM and Pulse tube. Cryocooler components and their performance influence will be covered, as well as cooling power vs. interface temperatures and staging. A comparison of application fields to cryocooler cooling technologies will be illustrated with application examples from 80 K down to 1.5 K. Limitations of cryocooler applications (mechanical vibrations, temperature oscillation electromagnetic interaction and instabilities) will conclude this part. The second part will be dedicated to novel concepts of cooling links, covering free fluid circulation loops (gravity assisted), and He forced flow circuits. Components like high-effectiveness counter-flow HEXs, and circulators will be illustrated. Ways of boosting the cooling power of cryocoolers vs. physical separation to the cooling interface will be explained. An overall comparison between He refrigerators and cryocoolers will conclude this course, completed with general advice and references.

About the speaker:

Torsten Koettig is an engineer and applied physicist, specialized in low temperature research and development for more than 21 years with experience in European and American research laboratories. Stages of his professional career as research scientist/engineer were at Lawrence Berkely National Laboratory US and at ESS Sweden before joining CERN as responsible scientist for the CERN Cryolab in 2013. Novel cooling strategies for SC cavities and magnets are the focus of his work.

Presenter: Dr KOETTIG, Torsten (CERN)