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Multiphysics design of a high heat-load superconducting undulator

Tuesday, 21 May 2024 16:00 (2 hours)

RadiaBeam is developing and manufacturing a 15-mm period, 1.15 T high temperature superconductor undulator using Magnesium Diboride (MgB₂) wire to operate in a temperature range of 10 K - 15 K. This temperature range can be achieved by a cryocooler, a simpler and less expensive cryogenic solution compared to a liquid helium approach. As the supported current density, and ultimately the quench behavior of MgB₂ wire, is a combined problem of magnetic field, tensile stress, tensile strain and temperature, a multiphysics approach is required. We will present the details of this multiphysics design addressing the magnetic, mechanical and thermal engineering challenges, along with the devices anticipated performance characteristics.

Footnotes

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Primary author: CHEN, Yung-Chuan (RadiaBeam Technologies)

Co-authors: SCHILLACI, Alessandro (RadiaBeam); CHIMALPOPOCA, Osvaldo (RadiaBeam Technologies); AGUSTSON, Ronald (RadiaBeam)

Presenter: CHEN, Yung-Chuan (RadiaBeam Technologies)

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