

## Academia-Industry Matching Event on Superconductivity for Accelerators for Medical Applications



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### **Cryogen free cryogenic cooling system for rotating superconducting magnets in medical accelerators**

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Large rotating magnets are essential components in hadron therapy facilities, with both proton and carbon ions. In the so called gantries, the beam is rotated and bent pointing through the patient tissues. This is achieved usually by tilting or rotating the complete and weighty magnet system. Present trends are directing to more compact and less power consuming gantries using superconducting magnets, where rotating cryogenic cooling system is required.

Under the EU Seventh Framework Programme, the SUPRAPOWER project pursues a 10 MW superconducting generator for wind turbines. In this project, a cryogen-free cryogenic cooling system for the generator rotor coils based on Gifford-McMahon cryocooler has been designed and validated experimentally. In this frame, a rotary joint has also been developed in order to connect the rotating cold head to the stationary helium compressor. Based on the cooling system developed for the superconducting generator, a similar cryogen-free design is outlined for superconducting gantries. Implementation of such rotary joints would offer a new solution for gantries with an unbounded rotation of 360°.

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**Session Classification:** Gantries