

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



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### **Superconductivity in cyclinacs for ion beam therapy**

*Friday 25 November 2016 10:20 (20 minutes)*

Cyclinacs are accelerators, which combine the two leading technologies in the medical field: a cyclotron injector (the workhorse accelerator in proton therapy and radiopharmacy) and a linac booster (the accelerator type used in every medium-sized hospital for radiotherapy and radioimaging). The linac technology offers the unique potential to increase the performance of accelerators for ion beam therapy, through the fast energy modulation and small transverse size of its high repetition rate pulsed beam. This allows to bring accelerators one step forward towards image guided ion beam therapy and thus, to increase the quality of beam delivery for the treatment of moving organs.

The superconducting technology plays here an essential role. Indeed, the most cost-effective solutions for cyclinacs make use of superconducting cyclotron injectors. Conceptual designs of such cyclotrons will be presented. In addition, using superconducting combined-function magnets (FFAG) in the beam delivery lines and gantries would allow to make the best use of the fast beam energy modulation of the linac while keeping beamline (i.e. facility) dimensions as compact as possible.

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**Session Classification:** Particle therapy