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## **Resonant Cavity for Beam Current Diagnostics in Medical Accelerators**

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Beam currents of particle accelerators used for cancer treatment are often on the nanoampere level. These currents are too low for standard beam current diagnostics used in other fields of particle accelerator science, e.g. current transformers. This led to the general adoption of ionization chambers for beam current and dose rate determination in medical accelerators. However, the development of the so-called FLASH radiation therapy requires beam currents too high for normal ionization chambers yet still too low for standard current transformers.

Resonant cavities have shown their capability to precisely detect nanoampere to microampere beam currents which renders them interesting for FLASH radiation therapy accelerators. After the design of a resonant cavity at Paul Scherrer Institut (PSI), a collaboration between PSI, Instrumentation Technologies, and Bergoz Instrumentation was established with the goal to develop a complete turn-key beam current diagnostics system readily available for medical accelerators. Two prototype systems were manufactured, installed, and tested at PROSCAN/PSI. We discuss the layout of the measurement systems and compare expected performance to beam current measurements.

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### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

**Primary author:** STULLE, Frank (BERGOZ Instrumentation)

**Co-authors:** Mr BISIACH, Danilo (Instrumentation Technologies); Mr TOUZAIN, Etienne (BERGOZ Instrumentation); BAYLE, Hervé (BERGOZ Instrumentation); SUN, Jilei (Paul Scherrer Institut); ROSKAR, Katarina (Instrumentation Technologies); CARGNELUTTI, Manuel (Instrumentation Technologies); DUPERREX, Pierre-Andre (Paul Scherrer Institut)

**Presenter:** STULLE, Frank (BERGOZ Instrumentation)

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