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Talk 2: Landscape of European Facilities Delivering Protons and Heavy Ions: Status and Perspectives

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Abstract:
Radiation hardness qualification procedures for electronic and microelectronic components as well as systems and boards often require testing at facilities –providing highly energetic protons, heavy ions, neutrons, electrons, gammas and to some extent pulsed X-rays, lasers, etc. –emulating the radiation effects of the devices under test close to reality. These probing radiations are generated mostly at particle accelerators or research reactors located almost exclusively at universities or publicly funded research institutions. Thus, users from industry as well as users from space agencies or academia are dependent on these institutions for providing them a fee-based service.

In recent decades, a variety of research facilities across Europe have opened their doors to external users, offering beam time at their accelerators and radiation probes. Certain facilities have developed professional services, providing regular beam time to commercial customers and academic users. This presentation will highlight European irradiation facilities that provide high-energy protons and heavy ions, showcasing established sites for standard device qualification and radiation hardness assurance. Over half of the facilities in the RADNEXT1 consortium offer either heavy ions or protons, and we will present an overview of their key technical parameters. Some facilities boast unique technical capabilities, suitable for non-standard applications or R&D challenges in radiation effects.

The landscape of these facilities is dynamic, with some closing permanently and others beginning operations. Additionally, many irradiation facilities are planning upgrades to enhance their technical capacities, such as increasing fluxes or energies to better meet user requirements. Existing facilities are also evaluating the expansion of their service provision, i.e. offering more beam time hours for radiation hardness testing. Furthermore, some proton therapy facilities that previously did not offer beam time to external users are now considering starting this service. This presentation aims to provide a concise overview of the current changes and activities in this field.

References
1 R. Garcia Alía et al., "Heavy Ion Energy Deposition and SEE Intercomparison Within the RADNEXT Irradiation Facility Network," in IEEE Transactions on Nuclear Science, vol. 70, no. 8, pp. 1596-1605, Aug. 2023, doi: 10.1109/TNS.2023.3260309.

CV:
Dr. Gerd Datzmann is a physicist by education and specialized in nuclear and accelerator physics at the Technical University Munich (TUM). During his PhD project, he developed and operated a nuclear microprobe for high energy protons and heavy ions.
After his PhD, Gerd Datzmann became head of physics at a company that built the first privately financed proton therapy center for cancer treatment in Europe, the RPTC in Munich.
In 2016, Dr. Datzmann founded his own company Datzmann interact & innovate GmbH (DINI). DINI provides a portfolio of services centering on accelerator applications in the field of advanced material analytics, proton therapy and radiation hardness testing.
Datzmann interact & innovate GmbH is a partner in the EU-program RADNEXT and is actively engaged in outreach and dissemination as well as in technology transfer activities to industry in the field of radiation hardness testing.

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