AIW 1: Medical Applications – Accelerators in the Service of Health

Time: Wednesday 14:00–15:30 Location: BAR/SCHÖ

AIW 1.1 Wed 14:00 BAR/SCHÖ

Welcome and greeting — •Hans-Georg Grothues[1] and •John Kettler[2] — [1]Chairman of the AIW — [2]actimondo eG, Inden

Invited Talk AIW 1.2 Wed 14:10 BAR/SCHÖ

From Particle Physics to Patient Care – The Evolution of Accelerator-Based Tumor Therapy in Germany — •Andrea Denker — Helmholtz-Zentrum für Materialien und Energie, Berlin

The origins of particle therapy in Germany lay in 1998: In July, the treatment of ocular tumours with protons started in a collaboration of Helmholtz-Zentrum Berlin and Charité – Universitätsmedizin Berlin and in August clinical studies using carbon ions began at GSI Helmholtzzentrum für Schwerionenforschung. In both cases accelerators, originally built for particle physics, were used.

Now, more than 25 years later, five centres provide particle therapy for cancer treatment and more than 30000 patients have been treated in Germany. This is an excellent example of an extremely successful technology transfer from fundamental research to health care.

In parallel to routine treatment, accompanying research is on-going. This comprises, among others, new forms of beam delivery with the hope to reduce side effects while maintaining tumour control. Examples are FLASH-irradiations, where the dose is applied in a very short time, and the spatial fractionation of the irradiation, the so-called minibeam. This new irradiation forms create new challenges for the (existing and future) accelerators.

Invited Talk AIW 1.3 Wed 14:30 BAR/SCHÖ

High Energy X-rays: Pioneering Hope and Success in Cancer Therapy — •Stefan Scheib — Varian Medical Systems Imaging Lab GmbH, Zürich

Non-communicable diseases such as cancer represent one of the greatest challenges in global healthcare. Radiation therapy is a cornerstone of cancer treatment, applied in approximately 50% of all cases worldwide. This presentation will outline the fundamental principles of radiation therapy and explore the production and clinical application of high-energy X-rays within modern treatment workflows. Advances in high-energy X-ray technology have significantly contributed to improved outcomes, including enhanced tumor control and increased overall survival rates. Finally, emerging research directions in high-energy X-ray–based radiation therapy will be discussed, underscoring the promise of continued progress and success in cancer care.

Invited Talk AIW 1.4 Wed 14:50 BAR/SCHÖ

A Compact Accelerator Driven Neutron Source for Industry and Medicine — •Holger Höltermann — Bevatech GmbH, Mörfelden-Walldorf

The use of neutrons is established since decades and essential for industry, medicine, life sciences, and research. Classical neutron sources are mainly neutron generators, with low neutron flux, or research reactors and spallation sources, which are large and cost intensive installations. A cost efficient, effective, and compact neutron source with neutron yields up to 1e13 neutrons per second could bridge the gap existing. It will offer potential users either a dedicated standalone version for high demands of a single application such as BNCT or a full variable user facility.

Discussion AIW 1.5 Wed 15:10 BAR/SCHÖ

Panel discussion: Precision, Particles, Patients – The Future of Accelerator-Based Therapies — •Andrea Denker[1], •Stefan Scheib[2], •Holger Höltermann[3], and •John Kettler[4] — [1]Helmholtz-Zentrum für Materialien und Energie — [2]Varian Medical Systems Imaging Lab GmbH — [3]Bevatech GmbH — [4]actimondo eG, Inden