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Beamline and target design of the future TATTOOS radionuclides facility at PSI

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The IMPACT (Isotope and Muon Production using Advanced Cyclotron and Target technologies) initiative is a two-fold upgrade project envisaged for the HIPA (High Intensity Proton Accelerator) machine at PSI. As part of IMPACT, the TATTOOS (Targeted Alpha Tumour Therapy and Other Oncological Solutions) facility is being developed in collaboration with the University of Zurich (UZH), and the University Hospital of Zurich (USZ). Housed in a new building, TATTOOS will be driven by the high power (up to 60 kW), 590 MeV, proton beam split off the main HIPA beam and guided to a hot target. The system will employ the ISOL (Isotope Separation On-Line) technique to produce radionuclides for diagnosis and therapy of cancer in quantities sufficient for clinical studies and for further radionuclide-driven research. This contribution will focus on the design of the proton beam line, regarding in particular the splitting procedure and the two competing layouts currently under discussion (45- and 90-degree bend with respect to the main proton beam), simulations and tests of the Ta-target as well as all shielding aspects related to operation, maintenance and target exchange. Emphasis will be given to the challenges that need to be tackled to achieve the ambitious goal of beam on target in 2030.

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