

8th High Power Targetry Workshop (HPTW2023)



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Overview of High-Power Targets and Strategies for Remote Handling at TRIUMF - Canada's Particle Accelerator Center

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TRIUMF laboratory, Canada's particle accelerator center, currently operates a range of high-power targets across various different facilities. Most target stations are supplied with protons from the cyclotron at the heart of the facility, capable of delivering four independently controllable beams at energies from 70 to 520MeV with a total current of up to 300 μ A. Along Beamline 1A, there are two target stations (T1 and T2) each operating beryllium targets (12mm and 5cm long respectively) used for pion and muon production. A side-stream off BL1A supplies protons to the Ultra Cold Neutron (UCN) experiment where they collide with a tungsten spallation target. The resulting fast neutrons are slowed in moderators and then reduced to ultra-cold speeds for observation and study. In the ISAC facility, commissioned with first beam in 2001, the proton beam is impinged upon targets made of various materials to produce rare isotope species for studies in different fields such as experimental nuclear physics, astrophysics, material science and nuclear medicine. In the ARIEL facility, which is currently under development, a proton target (APTW) and an electron target (AETE) will be run simultaneously to produce additional rare-isotope species. The proton station will accept up to 50kW at 500MeV from the main cyclotron and the electron target will be supplied by TRIUMF's new e-Linac with up to 100kW of beam power at 50MeV. The spent targets at all facilities become highly radioactive during irradiation (producing fields of up to 10Sv/hr at 1m). Remote handling techniques are therefore essential to safely perform target maintenance, replacement, and disposal. In this poster presentation, details and illustrations of the various targets and remote handling strategies for each will be presented.

Themes for the contribution

5 Target facility challenges:

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