



Contribution ID: 577 Contribution code: **WEPM134**

Type: **Poster Presentation**

A novel fiber-optic beam monitor

Wednesday, 10 May 2023 16:30 (2 hours)

Organic and inorganic Optical Fibers (OFs) are increasingly utilized in space and medical applications, including accelerator and reactor environments to monitor beam currents and shapes, doses, temperatures, and pressures [1-5]. OFs are ideal as they can be radiation hard, small in size, independent from electro-magnetic environments, and linear over a large measurement range. Here we present a new application in conjunction with a medical cyclotron, where a collar of four Ce-doped silica fibers is mounted onto a beam line. In our experiments, measurements of the OF scintillation signal from prompt neutrons and gammas produced by the proton beam as its bombardment position changes in a beam dump are made. This is an extension of our previous work with a similar setup to monitor beam delivery onto a medical isotope target at a cyclotron [6]. The advantage is that the OFs are outside of the vacuum and do not need to intercept the beam. Initial testing shows that monitoring of a 150 nA beam of 18 MeV protons into a beam dump is possible. The monitor can measure relative beam current and beam displacement in X and Y as a function of magnetic steering. Further testing is underway.

Funding Agency

TRIUMF receives funding via a contribution agreement with the National Research Council of Canada. This research was partially funded by the NSERC [RGPIN 2016-03972] and by the SNSF [CRSII5_180352].

Footnotes

- [1] Sensors, 2020, 20, 4510
- [2] Nukleonika, 2016, 61, 11
- [3] IEEE Sensors 2018, 18, 1513
- [4] Scientific Report, 2019, 9, 16376
- [5] 2016 JINST 11 P03027
- [6] Applied Sciences, 2020, 10, 4488

I have read and accept the Privacy Policy Statement

Yes

Primary author: USHEROVICH, Samuel (TRIUMF)

Co-authors: Prof. BRACCINI, Saverio (Albert Einstein Center for Fundamental Physics); CASOLARO, Pierluigi (Albert Einstein Center for Fundamental Physics); DEHNEL, Morgan (Dehnel - Particle Accelerator Components & Engineering, Inc.); GOTTSTEIN, Alexander (Albert Einstein Center for Fundamental Physics); HOEHR, Cornelia (TRIUMF); MATEU, Isidre (Albert Einstein Center for Fundamental Physics)

Presenter: HOEHR, Cornelia (TRIUMF)

Session Classification: Wednesday Poster Session

Track Classification: MC6: Beam Instrumentation, Controls, Feedback and Operational Aspects:
MC6.T03: Beam Diagnostics and Instrumentation