

Optical fiber array to monitor isotope production targets

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Low-energy cyclotrons are in use worldwide to produce medical isotopes for nuclear medicine. Beam monitoring during the irradiation of targets is difficult due to the high-power density of low-energy protons, space limitations and interference with the beam delivery. Doped silica fibers are sensitive to ionizing radiation, and produce radiation induced luminescence (RIL) when exposed. The fibers can be attached to the outside of the target in a low-profile fiber array, ensuring efficient and safe operation. We performed proof-of-principle experiments with different dopants and fiber diameter. Our results show that the RIL signature can be used to track the steering of a proton beam at a medical cyclotron, the beam intensity and the target material, and we are currently working on the design of a prototype.

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