

Momentum cooling for ProteusONE

The student will be introduced to our beam transport simulator starting from our existing compact beam line (CGTR) solution which delivers a proton beam at treatment location at energies ranging from 70 MeV to 230 MeV, according to the depth of the tumor in the body.

The CGTR beam line receives the beam from the accelerator at the maximum energy and makes it pass through a selected thickness of matter, called the degrader, in order to adapt its energy for the treatment. After this lossy process, the CGTR guides as much beam as possible toward the treatment area.

The student will work with our simulator on how to insert a thin wedge of matter at an optimal location along the beam line, which purpose is to correct the energy dispersion induced by the crossing of the degrader. It would potentially limit the beam losses along the line, reduce activation of components, and allow the system to deliver faster irradiation.

<https://www.nature.com/articles/s41567-023-02115-2>