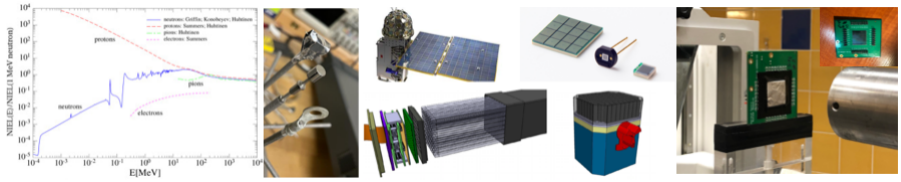

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Proton irradiation facilities and radiotherapy centre at IFJ PAN

Monday 25 April 2022 13:50 (25 minutes)

The Institute of Nuclear Physics of the Polish Academy of Sciences (IFJ PAN) in Krakow has two proton cyclotrons, the AIC-144 60 MeV cyclotron (designed and built at the IFJ PAN), and the IBA Proteus C-235 cyclotron, which produces a proton beam with an energy of 230 MeV mainly for proton radiotherapy.
The proton radiotherapy center (Cyclotron Centre Bronowice) at IFJ PAN is equipped with Proteus C-235 cyclotron two gantry rooms with PBS nozzle, a beam line dedicated for proton eye radiotherapy. In addition, CCB has an experimental room for nuclear physics experiments.
The AIC-144 60 MeV proton cyclotron facility has two proton irradiation stations: a small field horizontal line installed in the eye therapy hall and a high intensity proton line delivered beam to the AIC-144 experimental hall. These irradiation facilities enable proton irradiation to be performed very accurately over a wide range of doses (proton fluencies) and dose rates. The adjustable range of the proton beam current is 1- 100 nA, its energy range is 10-60 MeV, with proton flux values ranging between 5e5 p/cm - 2 s-1 and 1e9 p/cm -2 s-1. The total absorbed doses delivered to passively forming fields of about 10 cm in diameter may range between 5 mGy and 120 kGy.
This very precisely controlled and reproducible set of beam parameters allows proton beams to be applied in testing and quality control of clinical radiation detectors designed for radiotherapy purposes, in irradiating biological samples, including radiobiological experiments with animals, and in designing and performing tests of radiation hardness of electronics and materials applied in the space industry or around research accelerators.
Adequate beam-time at this stand-alone 60 MeV proton facility is readily available to external users, unlike in other such facilities that are typically share their beams on “parasitic”principles, competing with principal research or patient irradiation.

Author: Prof. SWAKON, Jan (Institute of Nuclear Physics Polish Academy of Sciences)

Presenter: Prof. SWAKON, Jan (Institute of Nuclear Physics Polish Academy of Sciences)

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