## Spatially fractionated proton therapy for eye cancer - Feasibility study

A. Toboła-Galus, P. Olko, J. Swakoń

Institute of Nuclear Physics Polish Academy of Sciences, PL-31342 Krakow, Poland

In therapy of eye melanoma (4x15 Gy(RBE)) the eyelid should be shifted from the treatment field to avoid strong skin reactions or the irradiation is performed through the eyelid. It is usually painful for the patient and sometimes even not possible for anatomical reasons.

The aim of these studies was to demonstrate the dosimetric feasibility of spatially fractionated proton therapy (SFPT) of eye with the closed eyelid. The proton beam is formed using a mesh collimators. The potential benefit of SFPT is better regeneration of microvascular structures of the irradiated eyelid.

Within the work the mesh-grid brass collimator and the dedicated range modulator were designed to obtain uniform SOBP within the target volume. The system was verified at the proton eye therapy facility at IFJ PAN.

The dose depth distributions was measured using Markus IC in the water phantom. Lateral profile has been determined in PMMA slab phantom using 2-D (LiF:Mg,Cu,P) thermoluminescent foils and the ProBImS scintillator system with a CCD camera.

Peak-to-Valley-Dose-Ratio (PVDR) at the region of collimator was varying between 3 to 5 but due to the proton scattering the dose distribution at the depth of the tumor (15-29 mm) was practically uniform.

The studies demonstrated that it is possible to form the proton beam to perform the SFTP treatment of eye melanoma through the closed eyelid.