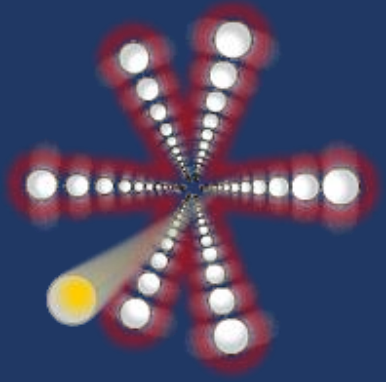


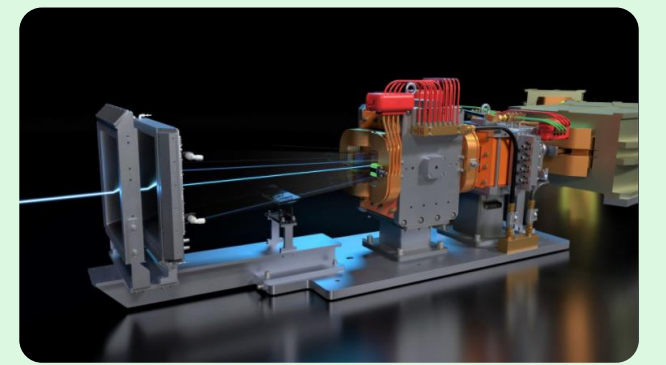
CONCEPT OF A NEW METHOD FOR DETERMINING THE TRANSVERSE PROFILE OF WIDE-APERTURE BEAMS



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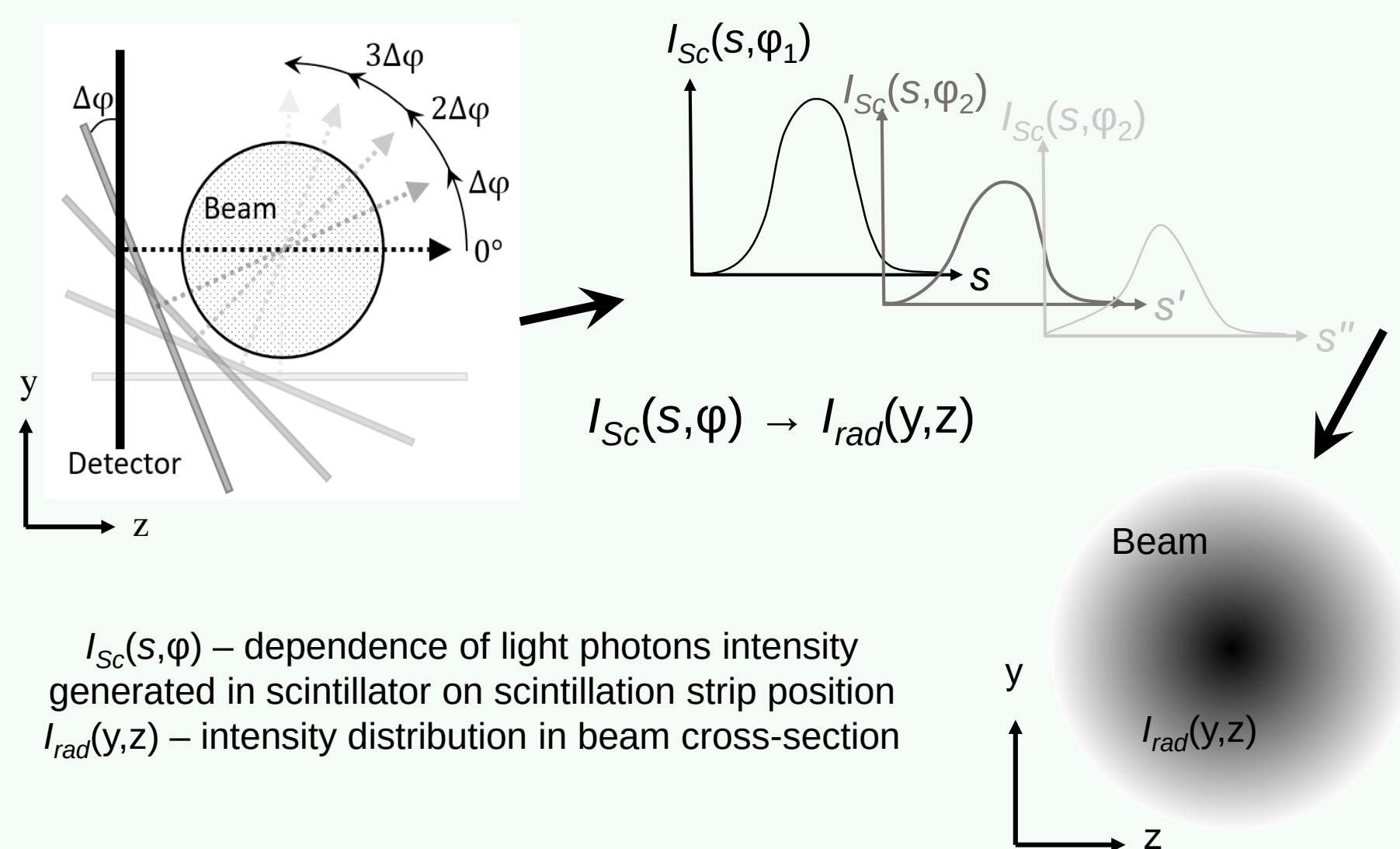
RELEVANCE

Within the rapid development of the new accelerator facilities for research and treatment purpose it is relevant task to create a high-precision monitoring systems for determination of the intensity, position and spatial distribution of the beam in real time with minimal particle flux disturbance.



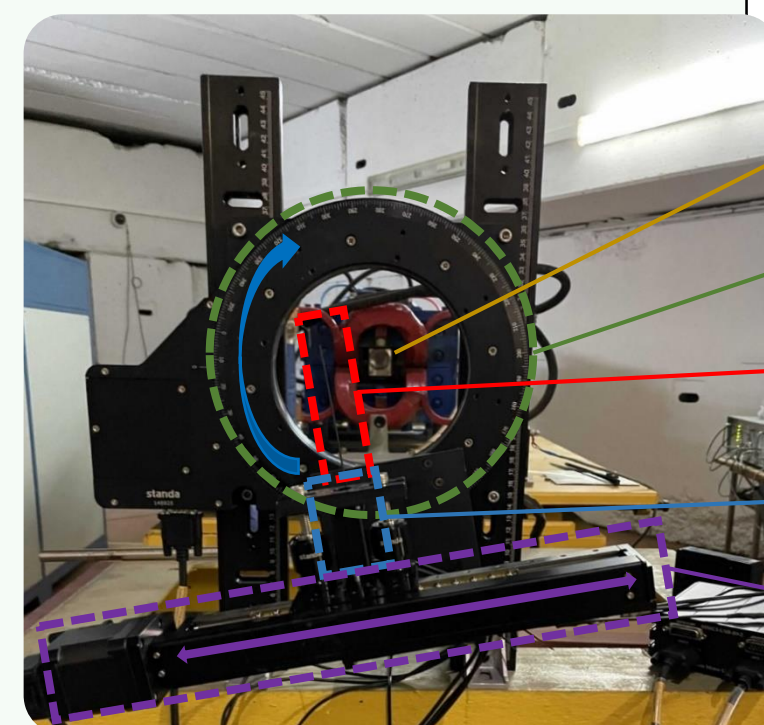
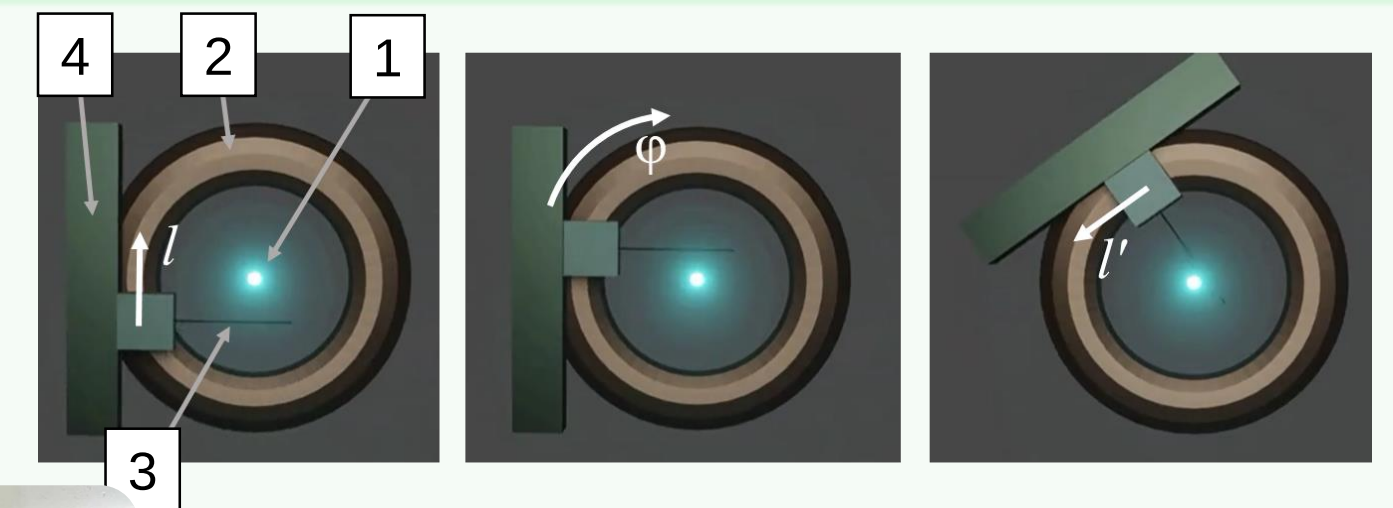
The aim of the study: development a new method for lateral beam profile determination by multiangular wire scanning.

THE METHOD OF MULTIANGULAR WIRE SCANNING



THE DETECTING DEVICE DEVELOPMENT

The movement must be carried out translationally in the measured plane perpendicular to the beam propagation in the direction I
 φ – angular displacement



- 1 Radiation source
- 2 Standa Motorized Rotation Stage
- 3 Saint-Gobain Scintillation fiber
- 4 KETEK Silicon Photomultiplier Tube
- 5 Standa Motorized Line Translator

EXPERIMENT ON THE $^{12}\text{C}^{6+}$ ION BEAM

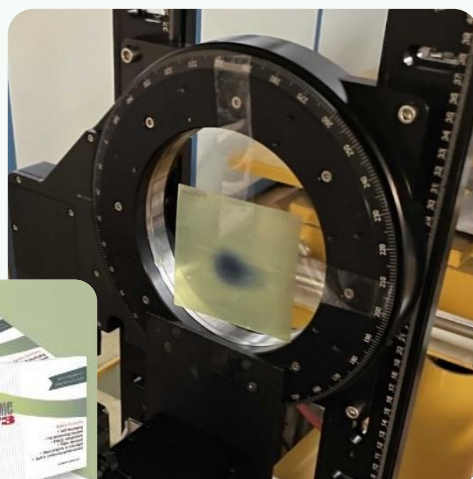


Experimental setup

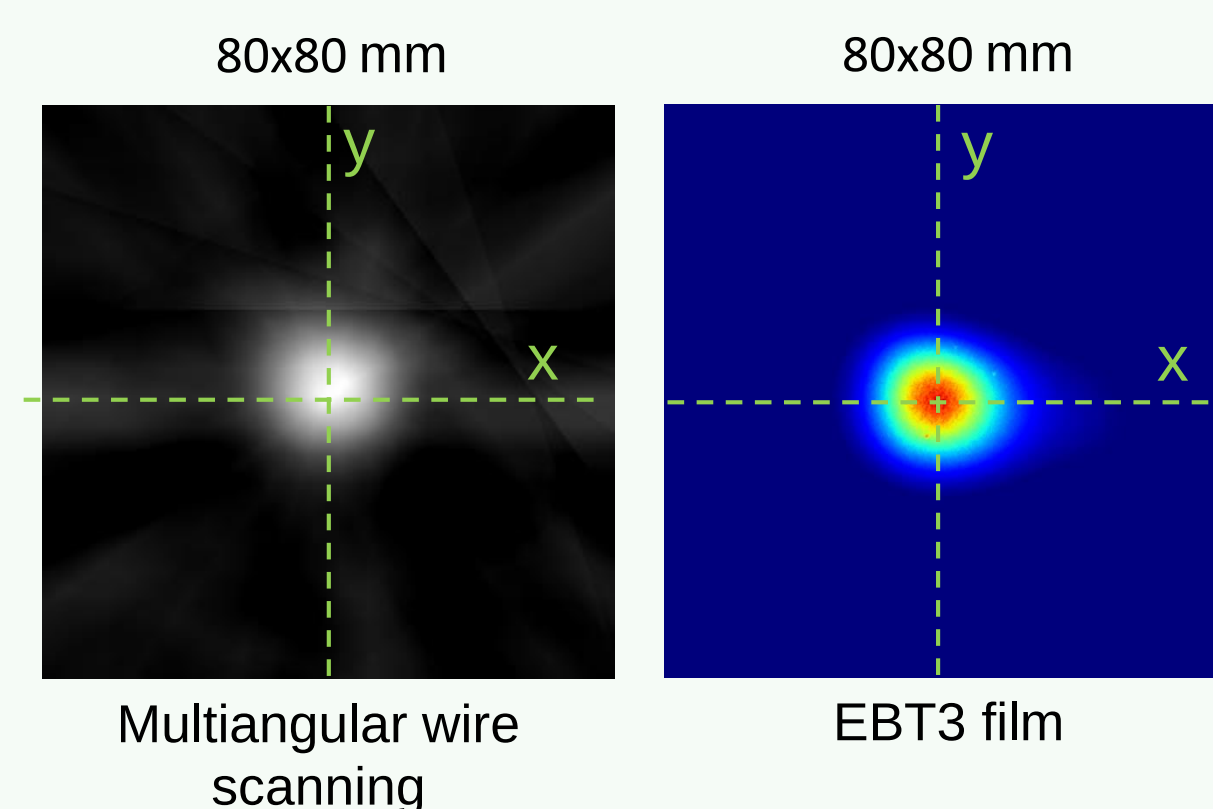
Experiment parameters:

- Beam energy – 300, 400 MeV/nucleon
- Detector step- 4 mm
- Angular displacement - 18°

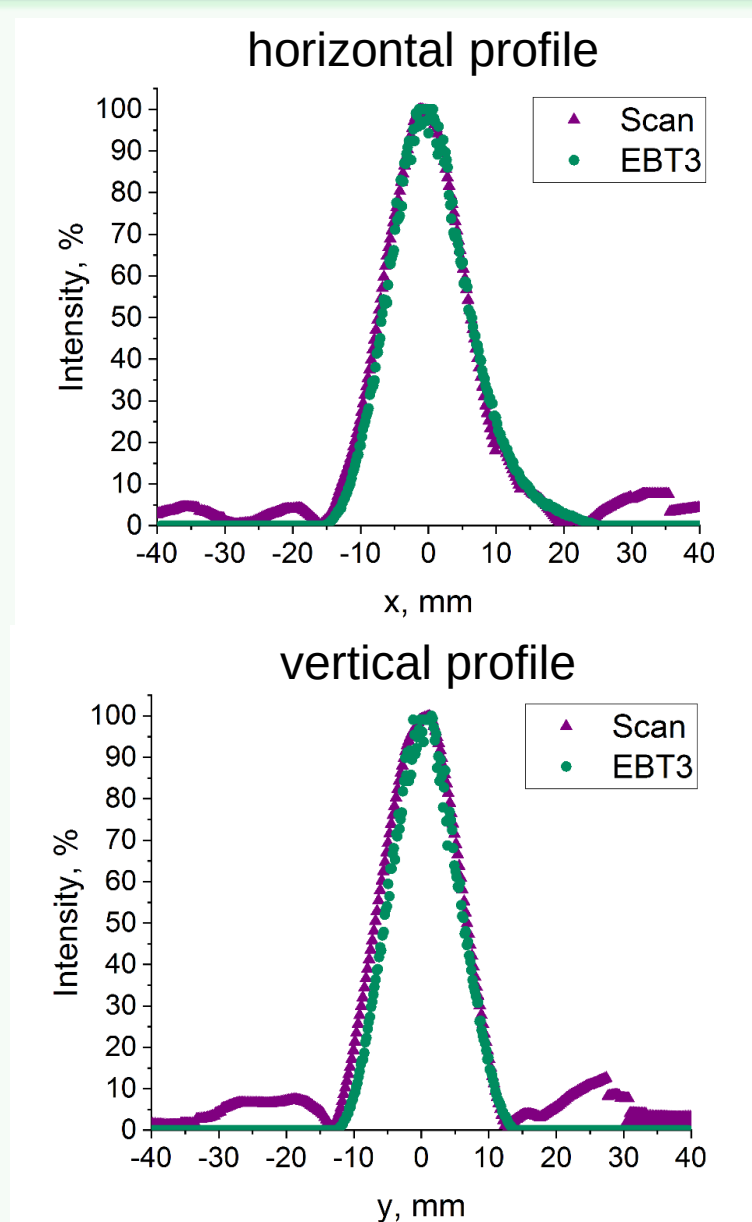
Comparison with film dosimeter
Gafchromic EBT3



ION BEAM SCAN RESULTS



Width at half-height of the vertical and horizontal profiles of carbon beam - 15 mm



EXPERIMENT ON THE ELECTRON BEAM

Experiment parameters:

- Beam energy – 5.7 MeV
- Detector step – 1 mm
- Angular displacement – 10°
- Beam profile - deformed



Example of a sinogram

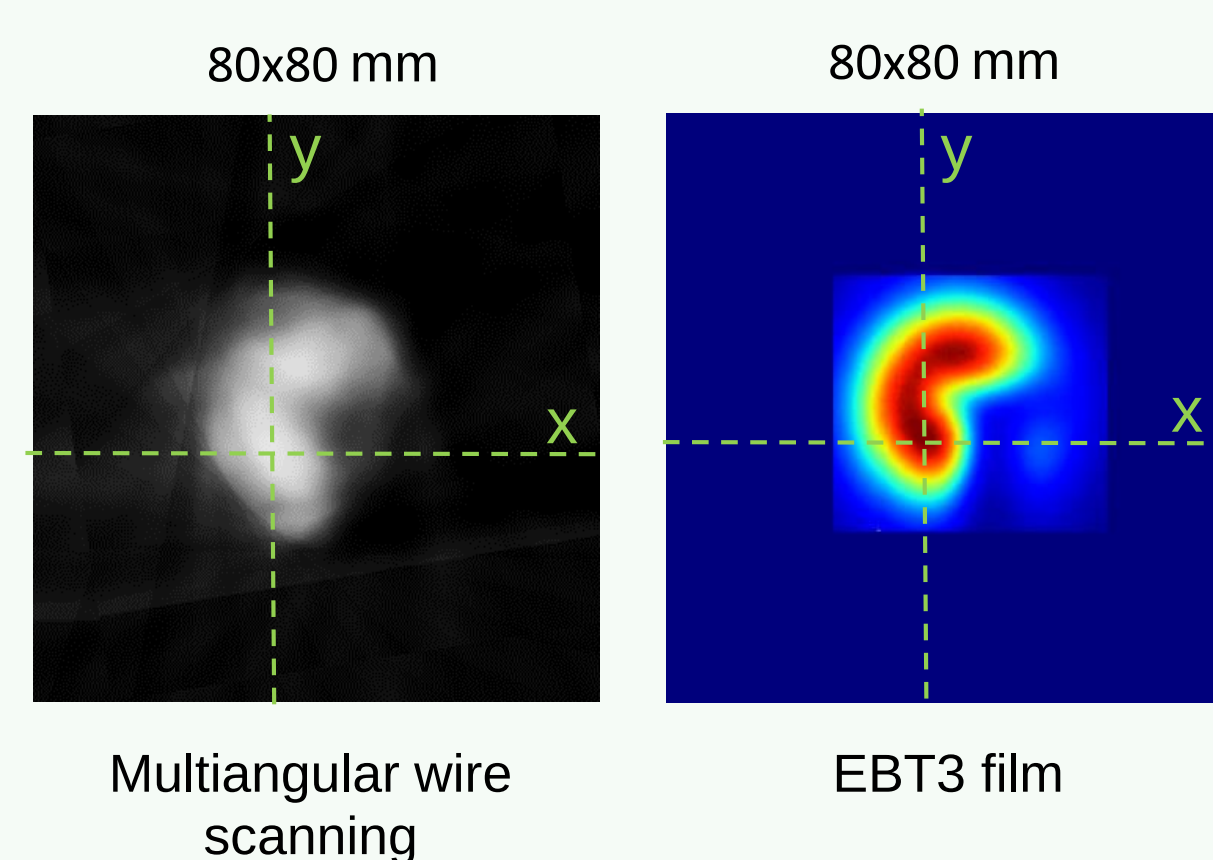


Experimental setup

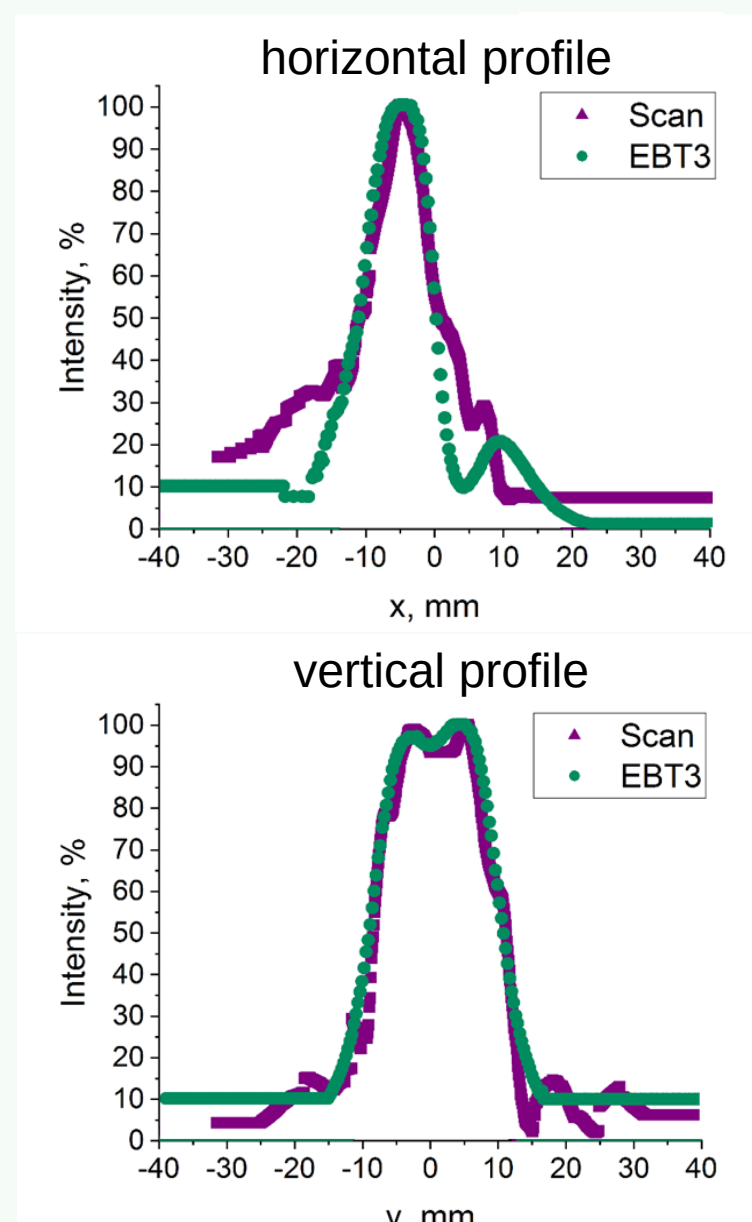
Comparison with film dosimeter Gafchromic EBT3



ELECTRON BEAM SCAN RESULTS



Projection beam sections with a deformed profile in the horizontal (x) and vertical (y) directions



CONCLUSION

- The investigation demonstrate the developing of the new method for lateral beam profile determination by multiangular wire scanning.
- As part of the work, a detecting setup was developed to measure the intensity of the beam distribution in the cross section of the charged particle beam.
- The optimal number of scans required to obtain the results in the minimum time was determined for an experimental setup based on a scintillation wire detector.
- The proposed method was tested on a carbon ion and electron beams and showed a good results.

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