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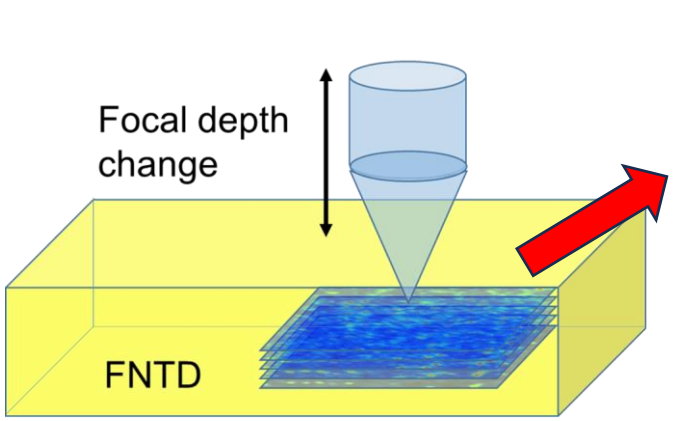
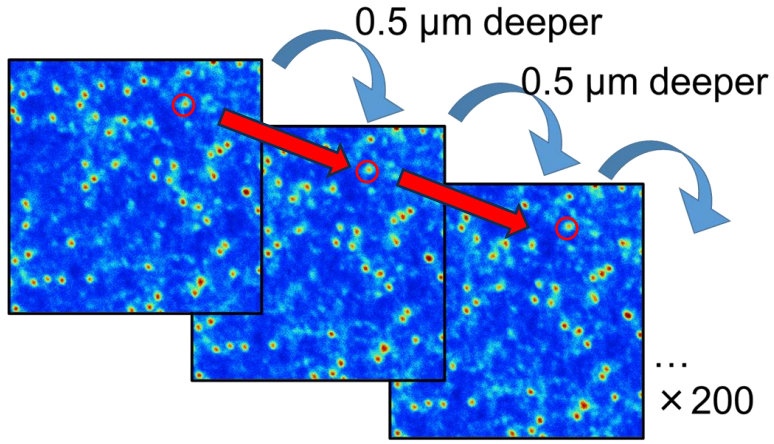
3D ion track extraction and nuclide identification with fluorescent nuclear track detectors by machine learning

F. Nikaido, K. Sakai, T. Taguchi, T. Minami, R. Kitamura, Y. Fukuda[A], S. Kodaira[B], T. Kusumoto[B], Y. Kuramitsu

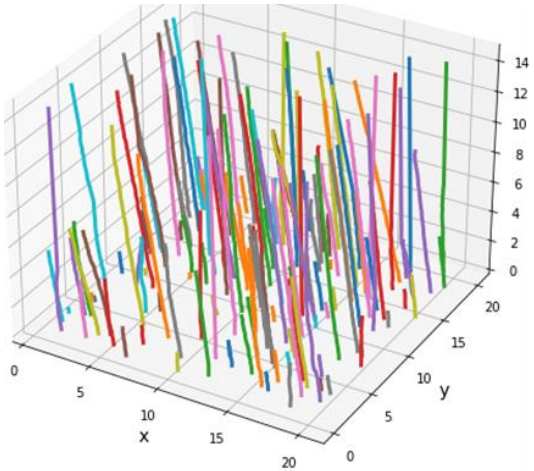
- We have developed the system which automatically extract 3D ion tracks from fluorescent nuclear track detectors (FNTDs) with machine learning.
- 3D ion tracks recorded on FNTDs are outputted as layered images. Therefore, it is difficult to extract them automatically in high fluence ion beams because we have to identify each ions from others and noises and track them across depth direction.
- We can calculate Brag curve of the ion from 3D ion track on FNTD, which correspondence to deposit energy of ions, and estimate nuclides.



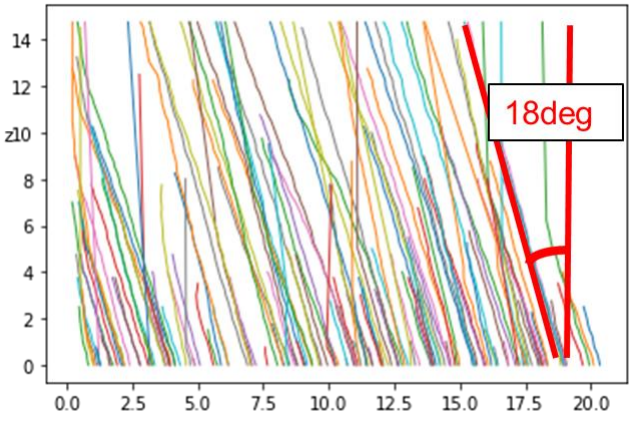
Scanning of FNTD



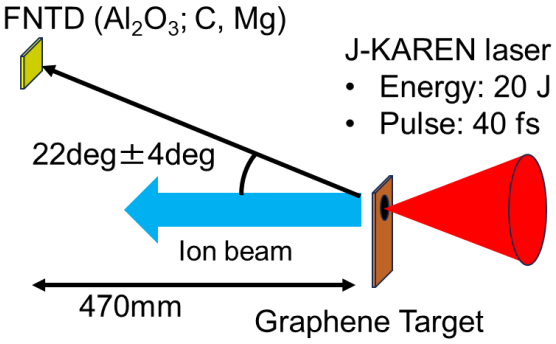
Ion track tracking



Extracted 3D ion tracks
(In 21 um x 21 um area,
149 ions are detected.)



Side view of ion tracks



Setup of the experiment