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# Energy-resolved neutron tomography of an unconventional cultured pearl at a pulsed spallation source using a microchannel plate camera

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## ABSTRACT

A non-destructive neutron analysis technique performed at the IMAT beamline of the STFC (Science and Technology Facility Council), UK, is presented. In this experiment, neutrons of different energy have been exploited to obtain a tomographic reconstruction of a biomineralic sample, more specifically a cultured pearl, by using a time-resolving pixel camera, the MicroChannel Plate (MCP) detector, utilizing an array of 2x2 Timepix readout chips. The MCP camera is capable of energy-resolved two-dimensional mapping of neutron transmission with a spatial resolution of  $\sim 55 \mu\text{m}$ . By using a Simultaneous Iterative Reconstruction Technique (SIRT), virtual sections of the internal part of the sample have been created, thus revealing several features inside its bulk. The crystallographic phase map via Bragg edge analysis, showing a phase fraction distribution on the entire specimen, has been generated as well. Finally, 3D volume rendering of the pearl is presented.

*Keywords:* Microchannel Plate, Neutron Imaging Detector, Energy Resolved imaging, Neutron Phase Mapping, Cultured Pearl

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