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New Perspectives for Neutron Imaging through Advanced Event-Mode Data Acquisition

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Recently developed event-driven detectors are capable of registering spots of light induced by neutron interactions in scintillator materials. Reconstructing the Center-of-Mass of the individual interactions, it is possible to significantly enhance spatial and temporal resolution of recorded radiographs. Utilizing this principle, we present a detector capable of Time-of-Flight imaging with an adjustable field-of-view, ad-hoc binning and re-binning of data based on the requirements of the experiment including the possibility of particle discrimination via the analysis of the event shape in space and time. It is considered that this novel concept might replace regular cameras in neutron imaging detectors as it provides superior detection capabilities compared to conventional frame-based camera systems.

Author: Dr LOSKO, Adrian (Heinz Maier-Leibnitz Zentrum)

Co-authors: Dr HAN, Yiyong (Heinz Maier-Leibnitz Zentrum); Dr SCHILLINGER, Burkhard (Heinz Maier-Leibnitz Zentrum); Dr TARTAGLIONE, Aureliano (Heinz Maier-Leibnitz Zentrum); Dr MORGANO, Manuel (Paul Scherrer Institut); Dr STROBL, Markus (Paul Scherrer Institut); Dr LONG, Jingming (Amsterdam Scientific Instruments); Dr TREMSIN, Anton (University of California); Dr SCHULZ, Michael (Heinz Maier-Leibnitz Zentrum)

Presenter: Dr LOSKO, Adrian (Heinz Maier-Leibnitz Zentrum)

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