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A Fast Imaging Pipeline for Transient Detection in Interferometric Data

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Modern radio interferometers generate vast volumes of raw data, demanding efficient processing to enable real-time or quasi-real-time astronomical analysis. A critical challenge is the detection of transient sources within wide-field interferometric images, which requires rapid imaging and robust discrimination between true transients and false positives.

In this talk, we present a Fast Imaging Pipeline designed to address this challenge. The pipeline processes snapshot visibilities to construct images in (quasi) real time, identifies point sources in difference maps, and employs cluster analysis to distinguish genuine transients from artefacts. FITrig, a GPU-accelerated transient detector integrated into the pipeline, enables the detection of transients directly from dirty images as they are produced. Developed as part of the SKA Science Data Processor prototyping efforts, this pipeline optimises interferometric data processing in preparation for the upcoming SKA science operations. Our approach demonstrates a scalable solution for future large-scale radio surveys, balancing speed and accuracy for transient detection.

Author: STOLYAROV, Vladislav (University of Cambridge)

Co-author: Dr LI, Xiaotong (University of Oxford, Université de Montréal, Mila (Quebec AI Institute), Ciela Institute)

Presenter: STOLYAROV, Vladislav (University of Cambridge)

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