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Gpu Acceleration of Time-Domain Radio Astronomy for the Ska Era

Friday, November 9, 2018, 3:00 pm

Location: SEH 2000

Abstract

The Square Kilometre Array (SKA) will be the largest radio telescope ever build. The SKA will be sensitive to frequencies in the range of 50MHz to 20GHz (wavelengths 15 mm to 6 m), meaning that the telescope will be able to do all sorts of interesting science from one of the most energetic events like Fast Radio Bursts (FRBs), through pulsars all the way to the beginning of the Universe. Our team at OeRC aims to demonstrate that the vast quantities of data produced by SKA can be processed in real time with help of the GPUs.

I will outline the data rate challenges that SKA poses, which are not only focused on the amounts of data we need to process in real time but also on energy efficiency aspect of SKA which is given by the telescope location.

I will describe Astro-Accelerate which is our prototype pipeline for SKA time-domain data processing, what's inside (the algorithms we have developed), and then conclude with a discussion about the real world impact on operational and capital costs that new faster GPU powered algorithms will have for the SKA project.

Biography

Karel Adamek received his PhD in theoretical astrophysics in 2016 at the Silesian University in Opava, Czech Republic. During his PhD study he worked on accretion processes around compact objects. Now he is a post-doctoral research associate at Department of Engineering Science, Oxford e-Research Centre, where he is working on accelerating algorithms on GPUs for the Square Kilometre Array radio telescope.