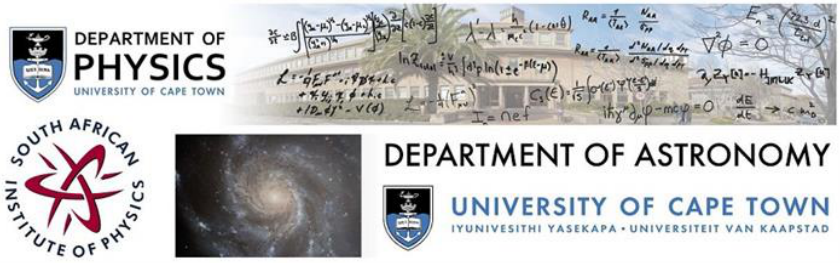

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Parallel computing solutions to the Balitsky-Kovchegov equation

Tuesday, 5 July 2016 11:10 (20 minutes)

Abstract content
   (Max 300 words)
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The JIMWLK (pronounced "gym walk") equation describes the energy evolution of observables in the colour glass condensate (CGC) state of matter, which is particularly relevant to collider physics. Currently there are many implementations of JIMWLK evolution in the spirit of the factorised Balitsky-Kovchegov (BK) equation for the total cross section. These include a number of efforts to consistently implement evolution at next-to-leading-order. Aside from NLO, there is a growing interest in studying new, more exclusive, observables, such as single transverse spin asymmetries and transverse momentum distributions.

These require the inclusion of new degrees of freedom, which can be done systematically by extending the Gaussian truncation of the JIMWLK equation. This necessarily increases the computational demands, both in terms of floating point operations and of storage requirements. After introducing the theoretical context, we will address the first computational step and show new, parallelised methods in code that evolves the BK equation.

Parallelisation of BK evolution using NVidia Cuda with implementation on a commercially available graphical processing unit (GPU) results in performance improvements of roughly an order of magnitude over comparable serial programmes. This will make possible significantly more accurate BK calculations for a number of applications in the CGC context.

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