



Contribution ID: 123

Type: Oral

## High-speed evaluation of loop integrals using lattice rules

*Tuesday 22 August 2017 17:10 (20 minutes)*

Using lattice generators, we implement lattice rules in CUDA for a many-core computation on GPUs. We discuss a high-speed evaluation of loop integrals, based on lattice rules combined with a suitable transformation. The theoretical background of the method and its capabilities will be outlined. Extensive results have been obtained for various rules and integral dimensions, and for classes of diagrams including 2-loop box and 3-loop self-energy diagrams with massive internal lines. Its application for extrapolation with respect to the dimensional regularization parameter is also tested. The current status of the project will be presented.

**Primary authors:** DE DONCKER, Elise (Western Michigan University); ALMULIHI, Ahmed (Western Michigan University); YUASA, Fukuko (High Energy Accelerator Research Organization (KEK))

**Presenter:** DE DONCKER, Elise (Western Michigan University)

**Session Classification:** Track 3: Computations in Theoretical Physics: Techniques and Methods

**Track Classification:** Track 3: Computations in Theoretical Physics: Techniques and Methods