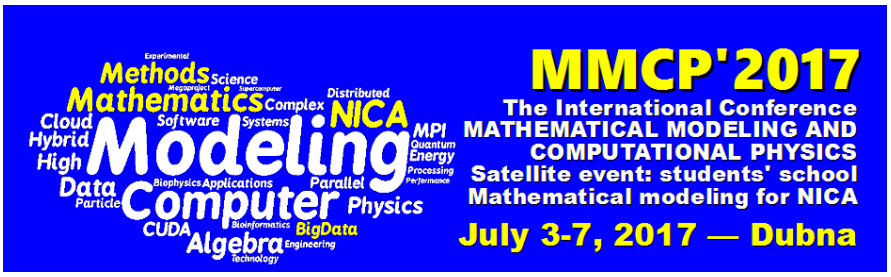

Contribution ID: **65** Type: **not specified**

Parallel implementation of numerical solution of few-body problem using Feynman's continual integrals

Monday, 3 July 2017 14:30 (15 minutes)

Modern parallel computing algorithm has been applied to the solution of the few-body problem. The approach is based on Feynman's continual integrals method implemented in C++ programming language using NVIDIA CUDA technology. Calculations were performed on the NVIDIA Tesla K40 accelerator installed within the heterogeneous cluster of the Laboratory of Information Technologies, Joint Institute for Nuclear Research, Dubna. A wide range of few-body bound systems has been considered including nuclei described as consisting of protons and neutrons (e.g., 3,4He), nuclei described as consisting of clusters and nucleons (e.g., 6He), as well as quark systems. The correctness of the results was checked by the comparison with the experimental data and the results obtained within other approaches. Parallel implementation of Feynman's continual integrals method significantly increases the speed of calculations, which, in certain cases, enables calculations impossible before. In addition, it allows one to reduce the mesh step in calculations of wave functions as well as obtain good statistics, which increases the accuracy of calculations.

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Session Classification: Physical processes modeling and related computational methods (I)