Contribution ID: **185** Type: **Oral**

Multiscale Lattice Gauge Theory Algorithms and Software for Exascale hardware.

Thursday 14 March 2024 14:30 (20 minutes)

I discuss software and algorithm development work in the lattice gauge theory community to develop performance portable software across a range of GPU architectures (Nvidia, AMD and Intel) and corresponding multi scale aware algorithm research to accelerate computation.
An example is given of a large effort to calculate the hadronic vacuum polarisation contribution to the anomalous magnetic moment of the muon, where bespoke multigrid algorithms are being developed and run on six different supercomputers in the USA and the EU.

Significance

Cutting edge lattice gauge theory performance with transformative multigrid algorithms
using GPU hardware that accelerates muon g-2 theory calculations by a factor of around 15x.

References

arXiv:2401.16620, 2203.17119, 2203.06777, 2103.05034, 1512.03487
Recent algorithms plenary talk at Lattice 2023 and talk at Algorithms ‘23.

Experiment context, if any

Theory prediction of HVP is critical to muon g-2 at FNAL.

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

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