







CASCADE CALL SPOKE2 - PUB3

Library for Quantum X-Dynamics (LIQUXD)



Vittorio Lubicz, Cecilia Tarantino Università Roma Tre & INFN

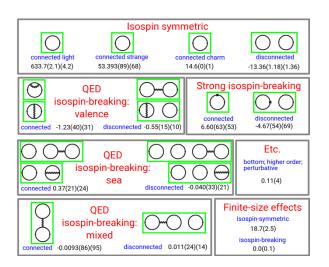


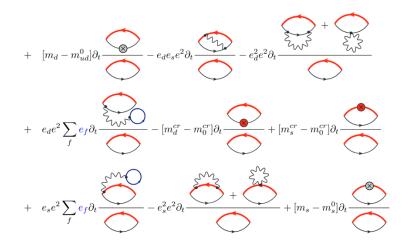
Library for Quantum X-Dynamics

- Creation of a library to simulate Quantum Field Theories on a lattice
- QXD: Quantum Chromo/Electro Dynamics

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Heterogeneous diagrams, needs automatic & efficient implementation in heterogeneous HPC

CPU & GPU for performances portability

- Lately both CPU and GPU are used in Lattice computations
- Optimal data layout of CPU & GPU are incompatible
- Different parallelizations: OpenMP vs. Cuda
- Different theories/measures needs multiple implementations

An optimal simultaneous use of CPU and GPU is the target of the project.

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By starting from components that are already available individually:

- Modern C++, CUDA, MPI, OpenMP
- Generic programming (<u>metaprogramming</u>)
- Abstraction of the data layout

We aim at building a complete and documented library

The Project

Duration: 15 Months

- Staff: C.Tarantino, PA 25%; V.Lubicz, PO 25% (60 k€)
- Recruiting: 2 years of "Contratto di Ricerca" (2 x 50 k€)
- Hardware: 3 x Servers with 2 x GPU to prototyping (60 k€)
- Indirect costs (24 k€)

Subject to adjustment (Assegno? Ammortamento?)