ZPPT
Particle Physics Theory

Peter Marquard

Liebenberg, September 2022

Members of the Group

The group is active in particle physics phenomenology using perturbation theory and lattice computations

5 staff members

K. Jansen , P. Marquard, S. Schaefer, H. Simma, R. Sommer $\rightarrow$ J. Green

5 postdocs + 1 software developer

J. Frison[†], A. Maier[†], K. Nakayama[†], A. Risch[†], L. Barca[*] (FOR5269)
+ 1 software developer[*] (Punch)

5 PhD students

A. Broll[*], L. Chimirri[*], A. Crippa[*] , M. Schneider[*], C. Tüysüz[*]

new hirings

lattice position successfully filled ✓
pheno hiring not successful ✗

[†] base funded, [*] third-party funded

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- Sufficient computing resources required to perform calculations
  $\leftrightarrow$ develop efficient algorithms to minimize cost

Research

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- Running strong coupling
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- Developments of algorithms and strategies
- Support of European collaborations
  - Configuration generation
  - Data management
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Technology transfer

- Application of methods to other fields, e.g. stat. physics, cond matter
- Quantum computing
  $\rightarrow$ Karl's talk

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Collaborations and Commitments

DFG Research Unit FOR5269

- Interdisciplinary project between applied math and physics
- Goal: algorithm development for computations of glueballs and charmonia on the lattice.

Punch4NFDI

- Modernize middleware and services of LDG (= regional grid of ILDG in Europe)
- Leverage and extend ILDG metadata handling $\rightarrow$ prototype for other research data
- Consolidate full compliance of ILDG with FAIR-data principles

DESY-RISC Linz collaboration

- Interdisciplinary project between applied math and physics
- Improved algorithms for symbolic computations