

# LATTICE FIELD THEORY

HT weeks 1-5 : 2pm Monday and 12noon Friday in Fisher Room

The first two lectures will consist of an overview which is intended to be accessible to graduate students in experimental HEP as well as to theory students.

Subsequent lectures will be appropriate for graduate students who have taken the field theory courses.

## Topics

- Overview (2 lectures): field theories in Euclidean space-time; their lattice discretisation; their Monte Carlo evaluation; finding the continuum limit; calculating the mass spectrum of hadrons in QCD; how the coupling runs in QCD.
- Discretising gauge fields, scalar fields and fermions on the lattice.
- Analytic calculations at strong coupling.
- Monte Carlo calculations at weak coupling.
- An application: using Monte Carlo techniques to investigate the large- $N$  physics of  $SU(N)$  gauge theories in 2+1 and 3+1 dimensions.

**Mike Teper**