

FAKULTÄT für PHYSIK  
LUDWIG-MAXIMILIANS-UNIVERSITÄT  
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT  
TECHNISCHE UNIVERSITÄT MÜNCHEN  
MÜNCHEN/GARCHING

## MLL-KOLLOQUIUM

Donnerstag, 07.01.2016, 16<sup>15</sup> Uhr

Seminarraum 127, TUM, Physik II, Erdgeschoss/Nord  
Treffen zum gemeinsamen Kaffee 16 Uhr

**Prof. Gerhard Buchalla**

(LMU München)

### New physics in the Higgs sector - an effective theory approach

Measurements of Higgs couplings are so far compatible with the standard model, but substantial deviations of order 10% or more are currently still allowed. Anomalous Higgs couplings might therefore be the largest new-physics effects in the electroweak sector, potentially dominating over those in the well-constrained gauge interactions. Such a scenario is expected in models of dynamical electroweak symmetry breaking. Its test will be a central goal of the LHC program and is well matched to the projected sensitivity of few percent with  $300 \text{ fb}^{-1}$  of integrated luminosity to be collected in run 2 and 3.

The natural framework to describe sizable new physics in the Higgs couplings, formulated as a consistent effective field theory (EFT), is provided by the electroweak chiral Lagrangian. Its systematics will be discussed, in particular the power counting by chiral dimensions, equivalent to a loop expansion. The chiral Lagrangian reduces, at leading order, to a parametrization of Higgs couplings that is widely used in experimental studies (kappa-formalism). The latter thus receives a proper quantum field theory justification. The results of a fit of Higgs couplings to current data within this framework will also be presented, emphasizing the EFT interpretation.

gez. Peter Thirolf  
Tel. 289-14064

gez. Norbert Kaiser  
Tel. 289-12367