PHENOMENOLOGY OF EFFECTIVE FIELD THEORY AND SCALAR EXTENSIONS IN THE STANDARD MODEL

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Abstract

The introduction of the higher dimensional operators to the Standard Model Lagrangian violates the unitarity of $2 \to 2$ scattering processes, depending on the values of the Wilson coefficients of the higher dimensional operators. Bounds on these coefficients may be obtained from demanding that there be no such unitarity violation below the scale of the effective theory. For scalar extensions in the SM, a detailed study of the scalar potential for models with extra scalars is important to rule out certain portions of the parameter space and hence to pin down the search strategies in experiments. The potential of a real singlet scalar enhanced SM can be Z_2 asymmetric or Z_2 symmetric leading to a dark matter candidate. Also, a charged scalar particle is one of the appealing exotic candidates in particle phenomenology and has been searched for long. The Georgi Machacek (GM) model, consisting of two scalar triplets, and having a large triplet vev induces a large mixing between the GM and the SM sector leading to interesting search processes for the non standard scalars. In particular, the charged scalar of the GM model couples to the SM fermions with a strength directly proportional to the vev (v_t) and a significantly large v_t enhances the detection possibility of such charged scalar at the collider. We probed the parameter space for the singly charged Higgs decaying into tb, $w^{\pm}h$, $\tau\nu$, cs, and for the heavy neutral Higgs decaying into $\tau^+\tau^-$.

Venue

PAMU Seminar Room

A.N. Kolmogorov Building, ISI, Kolkata

Date & Time

28 May, 2025
03:00 PM

Everyone is invited to attend