

Color Octet Scalar in E_6 Grand Unified Theory

C DASH AND S MISHRA[†]

Berhampur University, Berhampur-760007, Odisha

Email: dash25chandini@gmail.com, [†]mishrasnigdha60@gmail.com

Received 3.6.22, Accepted 30.6.22

Abstract: We propose a minimal E_6 GUT with intermediate trinification $SU(3)_C \otimes SU(3)_L \otimes SU(3)_R$ symmetry. We assume that in presence of non-renormalizable dimension-5 operator, the discrete left-right symmetry, called D-parity is spontaneously broken at the unification mass scale M_U ensuring unequal coupling between g_{3L} and g_{3R} corresponding to $SU(3)_L$ and $SU(3)_R$ respectively. It is shown that in presence of a massive weak singlet color-octet scalar, the predicted value of M_U is compatible with the accessible limit of the proton lifetime. The color octet scalar with mass of the order of few hundred GeV may suppress the production of the Higgs boson through gluon-fusion at LHC.

Keywords: D-parity, Color octet, Trinification symmetry, Gravitational correction.

PACS numbers: 12.10.Dm, 12.60.-i, 11.10.Hi, 14.80.-j