Dark Left-Right Gauge Model: $SU(2)_R$ Phenomenology

Alfredo Aranda,[1,2*] J. Lorenzo Díaz-Cruz,[2,3] Jaime Hernández-Sánchez,[2,4] and Ernest Ma[5]

[1]*Facultad de Ciencias - CUICBAS,*

Universidad de Colima, México

[2]*Dual C-P Institute of High Energy Physics, México*

[3]*C.A. de Particulas, Campos y Relatividad,*

FCFM-BUAP, Puebla, Pue., Mexico

[4] *Facultad de Ciencias de la Electrónica,*

BUAP, Avenida San Claudio y 18 Sur,

C. P. 72500, Puebla, Pue., México

[5] *Department of Physics and Astronomy,*

University of California,

Riverside, California 92521, USA

(Dated: November 12, 2018)

In the recently proposed dark left-right gauge model of particle interactions, the left-handed fermion doublet $(\nu, e)_L$ is connected to its right-handed counterpart $(n, e)_R$ through a scalar bidoublet, but ν_L couples to n_R only through ϕ_1^0 which has no vacuum expectation value. The usual R parity, i.e. $R = (-)^{3B+L+2j}$, can be defined for this nonsupersymmetric model so that both n and Φ_1 are odd together with $W_R^{\pm}$. The lightest n is thus a viable dark-matter candidate (scotino). Here we explore the phenomenology associated with the $SU(2)_R$ gauge group of this model, which allows it to appear at the TeV energy scale. The exciting possibility of $Z' \to 8$ charged leptons is discussed.

I.   INTRODUCTION

The nonsupersymmetric dark left-right model (DLRM) proposed recently [1] is a variant of a supersymmetric left-right extension of the standard model (SM) of particle interactions based on E_6 and inspired by string theory some 23 years ago [2, 3]. It has a number of

---

∗ Electronic address:fefo@ucol.mx