Phenomenology of Closed String Hidden Photons

Luca Caraffi*†[1,2], Erika Chinaia[1], Michele Cicoli[1,2], and Ling Lin[1,2]

[1]University of Bologna, Department of Physics – Via Irnerio 46, Italy
[2]Istituto Nazionale di Fisica Nucleare, Sezione di Bologna (INFN, Sezione di Bologna) – Viale B. Pichat, 6/2 40127 Bologna, Italy

Abstract

Ramond-Ramond photons are a generic feature of type II string compactifications. Being typically massless and gravitationally coupled to string moduli, those hidden photons behave as dark radiation produced at reheating from the decay of the lightest modulus. In this talk I will inspect their production mechanism and I will show that the requirement to avoid dark radiation overproduction poses a strong challenge for any model which features flat complex structure moduli at tree-level, as argued by the tadpole conjecture. We will discover how the best case scenario is the one where all complex structure moduli are heavy and reheating is driven by the decay of the Kähler moduli whose decay width into RR hidden photons is negligible.

Keywords: Dark Photons, RR Photons, Tadpole Conjecture, Type IIB, Type IIB String Compactifications, Dark Radiation, Effective Species of Neutrino, LVS

*Speaker
†Corresponding author: luca.caraffi2@unibo.it