

Institut Ruđer Bošković  
ZAVOD ZA TEORIJSKU FIZIKU  
Bijenička c. 54  
ZAGREB, HRVATSKA

---

SEMINAR ZAVODA ZA TEORIJSKU FIZIKU  
(Zajednički seminari Zavoda za teorijsku fiziku,  
Zavoda za eksperimentalnu fiziku IRB-a i Fizičkog odsjeka PMF-a)

## Spontaneous Lorentz Violation: The Case of Infrared QED

**Amilcar R. de Queiroz**

Brasília University, Brazil  
Zaragoza University, Spain

Datum: utorak, 11. studenog 2014.  
Vrijeme : **11:00 sati s.t. (TOČNO)**  
Mjesto: IRB, dvorana I krilo

### Abstract:

Long ago Frohlich, Morchio and Strocchi discovered that Lorentz symmetry is spontaneously broken in QED. This work was later extended. Based on this literature, two of us proposed a simple modification of QED incorporating this Lorentz violation, but compatible in particular with locality, which is based on a generalization of the  $U(1)$  charge group of QED to the Sky group and the study of its superselection sectors. We further elaborate this approach here and investigate in some detail the properties of charged particles dressed by the infrared photons. Violation of Lorentz invariance is manifest in the dispersion relation and can be confirmed by its measurement. The mass of the charged particle is not Lorentz invariant and that affects its spin content. Time dilation formulae for decays also get corrections. These effects can be measured.

Voditeljica seminara:  
Kornelija Passek-Kumerički  
<[passek@irb.hr](mailto:passek@irb.hr)>