SEMPARIS – Séminaires en région parisienne

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Cours

Lundi 2 Mai 2022, 14 :30
IAP, IJCLab d'Orsay(Details sur : https ://indico.ijclab.in2p3.fr/event/8277/)
Domaines : hep-ph

Titre : *The U boson as a generalized dark photon*

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Résumé : *Could a new interaction exist in nature ? Beyond weak, electromagnetic and strong interactions within the standard model, it is natural to enquire about an additional one, associated with an extra-*$U(1)$ *gauge group. The corresponding boson, called* U *forty years ago, may be (very) light, and (very) weakly coupled, its properties depending on* m_U*, the size of its coupling, and associated current (which further depends on the Brout-Englert-Higgs sector). Its vector part is a combination of electromagnetic with* B *and* L *(or* $B-L$*) currents. Axial couplings may also be present, which may make the spin-1* U *boson interact much like a spin-0 axion-like particle.*

We discuss, in connection with the underlying theory, some of the effects of such a new boson, including its production in $e^+ e^-$ *annihilations and beam dump experiments,* ψ*,* Y *and* K *decays, parity-violation effects in atomic physics, anomalous magnetic moments of charged leptons, non-standard neutrino interactions, a possible "protophobic" behaviour suppressing* $\pi^0 \to \gamma U$ *decays (related with a tentative interpretation of the Atomki anomaly in some nuclear reactions). The* U *may also serve as a mediator to a new dark sector, allowing for thermally-produced light dark matter particles.*