

Abstract Submitted
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Induced Electric Charge by the Scalar Field in 5D General Relativity YAROSLAV BALYTSKYI, UCCS, Department of Physics and Energy Science, LANCE WILLIAMS, Konfluence Research Institute, Manitou Springs, Colorado, ELLIOTT SIMONS, University of Colorado Boulder, Department of Physics, ANATOLIY PINCHUK, UCCS, Department of Physics and Energy Science — The Higgs boson discovered in 2013 makes the Standard Model complete and the search for the New Physics becomes the question of paramount importance in Physics. One of the most promising directions is the idea of extra dimensions. In 1921, Kaluza published a hypothesis that General Relativity and Electromagnetism can be unified as General Relativity extended to five dimensions. If such an extension takes place, inevitably an additional scalar degree of freedom arises. It was shown recently that this long-range Kaluza scalar field leads to force effects which can be measurable in the laboratory settings. In our work, we show that in addition to these force effects, the same Kaluza scalar field acts as an effective dielectric permittivity of the space and its inhomogeneity effectively leads to induction of an electric charge which can be also measurable in the laboratory settings. In the talk, we will discuss the properties of this effective charge as well as possible experimental setup for its search. While there is an program at the Large Hadron Collider (LHC) for the search of extra dimensions, the experimental setup which we propose can be a complement to this program and probe such kind of the New Physics.

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