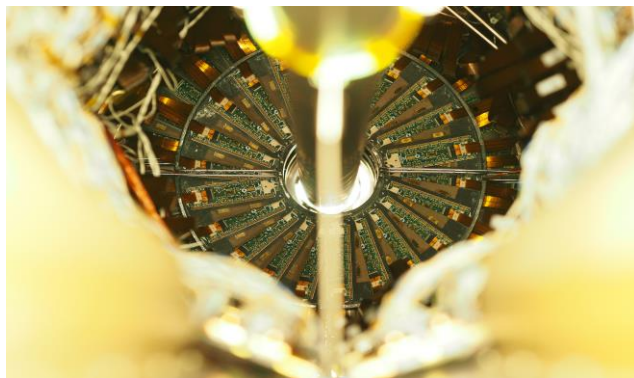




LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS (LEPP)

Joint Experimental and Theory Seminar in Particle Physics and Cosmology

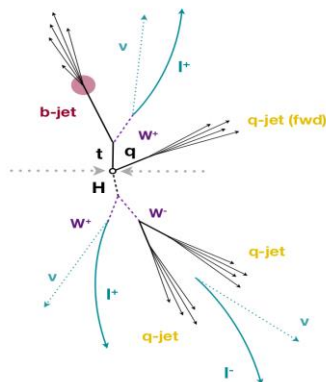
Jose Monroy
University of
Nebraska-Lincoln



The inverted top-Higgs coupling and a bit on how the CMS pixel detector was built

The exciting work in HEP includes not only the analysis of the data taken by the experiment, but also the development of detection systems. In this talk, I will present the results of the search for the production of a Higgs boson in association with a single top quark (tH), focusing on leptonic signatures provided by the $H \rightarrow WW$, $H \rightarrow \tau\tau$, and $H \rightarrow ZZ$ decay modes. This process is of particular interest due to its sensitivity to the relative sign of the top-Higgs coupling and the vector bosons-Higgs coupling. The analysis exploits signatures with two same-sign leptons or three leptons in the final state, and uses the 2016 data sample collected with the CMS detector at the LHC at a center of mass energy of 13 TeV. Multivariate techniques are used to discriminate the signal from the dominant backgrounds.

After the results from the data analysis, I will present my contributions to the construction of the CMS forward pixel detector (FPix), part of the innermost detection system, responsible for tracking with extreme accuracy the paths of particles emerging from the proton-proton collisions at CMS. FPix is a modular detector composed of 672 modules built using a semiautomatic pick-and-place robotic system which integrates optical tools, pattern recognition algorithms, and glue dispensing subsystems, to locate the constituent module parts on the work field and glue them together with a precision of ~ 10 μm . Fully assembled modules were tested and characterized.



Wednesday, May 23, 2018

2:00pm

301 Physical Sciences Bldg.