## X NExT PhD Workshop



Contribution ID: 17

Type: not specified

## Search for tZq production in association with a Z boson in the dilepton final state

Wednesday 31 March 2021 16:24 (6 minutes)

First observed by the CDF and D0 collaborations at Fermilab in 1995, the top quark is the heaviest of the known elementary particles and has a mass of around 172.6 GeV. Its heavy mass leads to it having a short lifetime of 10-24 s, which is less than the time scale required for hadronization. Therefore, unlike other quarks, the top quark can pass on spin information to its decay particles. Its mass also enables it to be the only quark heavy enough to decay into a W boson and bjet. These are some of the reasons that motivate the study of top quark production. In the LHC, the dominant production mode is top-antitop pair production, but the top quark can also be produced singly, in association with a heavy vector boson. An example of this is tZq production, which has been observed by CMS in the t-channel in the trilepton final state. The tZq production mechanisms are predicted by the Standard Model (SM) and are sensitive to both the tZ and WWZ couplings. They therefore can be used to probe electroweak interactions that involve a top quark. Additionally, tZq production forms an irreducible background to rare SM processes, such as tH production and to Beyond the Standard Model processes, such as flavour changing neutral current production (tZq-FCNC). This talk will discuss the current search for tZq production in the t-channel in the dilepton final state. For the search, a shape-based analysis is conducted of data recorded by the CMS detector in 2016, 2017 and 2018, and of simulation samples.

**Presenter:** COLDHAM, Kathryn Wendy (Brunel University (GB))

Session Classification: Student Session