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Hardware and Physics Studies at KAHVELab

Tuesday, 30 August 2022 18:00 (1h 30m)

The emphasis of the talk will be related to the physics studies at the KAHVELab, and on top of that I will be mentioning current status of hardware development at our laboratory.

The analysis focuses on FCNC decay channel $pp \rightarrow DD \rightarrow XjZj \rightarrow 4j2\ell$ where X represents a boson that decays hadronically and Z boson which decays leptonically. The D quarks are predicted by universal gauge theory based on $E6$ Model that suggests unification of strong, electromagnetic and weak forces where more detail can be found at <https://inspirehep.net/literature/100124>. The analysis is currently conducted with data gathered by ATLAS detector between 2015 and 2018, but preliminary version will be presented with our signal studies via Delphes.

Furthermore, we have been developing proton and electron beam machines at MeV energies with the aim of using the p-machine for PIXE spectroscopy and e-machine for industrial applications. Both machines are designed and produced with local resources. The proton machine will be part of RFQ linac that operates at 800 MHz which aims to be smallest and most energetic one of its kind. These machines will also be used to develop particle detectors and educate next generation of accelerator physicists.

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