On Participation Institute of Quantum Physics and Engineering Technologies (IQPET) of the Georgian Technical University (GTU) in the DUNE experiment

Zviad Tsamalaidze
On behalf of the GTU-DUNE team

Georgia

Tbilisi

The Georgian Technical University (GTU)

GTU is THE LARGEST UNIVERSITY IN TRANSCAUCASIA

- Established -- January 16, 1922
- Location -- Tbilisi, Georgia
- Campus -- 9
- Website -- www.gtu.ge

Georgian Technical University (GTU)

- 8 faculties
- 34 departments
- 64 educational scientific centers
- 14 scientific-research institutes
- Academic Personnel–1086
    1. Full Professors-357
    2. Associate Professors–526
    3. Assistant Professors–203
    4. Invited Professors–190
- Undergraduates 20000
- Postgraduates 3000

IQPET,GTU group in DUNE

IB representative : Tsamalaidze Zviad

Tsamalaidze Zviad – Chief researcher, physicist.
Experience: ARES (JINR), PIBETA (PSI, Swiss), CMS (CERN), E391a, ILC and COMET (KEK, J-PARC, Japan)

- Bagaturia Iuri – chief researcher, physicist.
  Experience: PIBETA (PSI Swiss), HERA-B (DESY, Germany), LHCb , CMS (CERN), COMET (J-PARC)
- Chokheli David – senior researcher, physicist.
  Experience: CDF and Mu2e (Fermilab)
- Khvedelidze Arsen – chief researcher, theoretical physicist.
  Experience : CMS (CERN), COMET (KEK, J-PARC)
- Lomidze Irakli – PhD student, physicist.
  Experience: CMS (CERN), COMET (KEK, J-PARC)
- Tsverava Nika - PhD student, physicist.
  Experience: COMET (KEK, J-PARC)
- Adamov George - young researcher, engineer-programmer.
  Experience: CMS (CERN), COMET (KEK, J-PARC, Japan)

The areas of expertise in our group

Design, construction, assembling, optical quality test, general characterization using rad. Sources, calibration, aging, data tacking & analysis

- Scintillation detectors with organic & inorganic scintillators. Electromagnetic and Hadron calorimetries
- Gaseous detectors
  - MWPC, Drift chambers, Straw trackers, RPC detectors

1. PMT (characterization, optimization for single photon counting or wide dynamic range)
2. SiPM (characterization, radiation hardness studies)
3. APD (characterization)
4. Adaptive Gain Integrating Pixel Detector (characterization, calibration)

1) Software Development (web-development, system programming)
2) DevOps (cluster administration, cloud infrastructure development)
3) Electronics (hardware architecture, embedded systems development, firmware programming)
4) Set of development tool for library listing for the CMSSW framework used in the CMS experiment
5) Web tool for the HCAL update progress accounting
6) Parallelization of the reconstruction algorithms using CUDA technologies for the CMS experiment

Our interest in the DUNE

We plan our activity mainly in the DUNE_ND detector

We will take part in the creation of Straw Tube Tracker and Electromagnetic Calorimeter.
Participation in detector R&D, construction, assembling and beam tests of prototypes including activity in Fermilab and CERN.

Also we are planing:

- Participation in beam tests
- Assembling of detector modules
- Final assembling, calibration and installation of detectors

Simulation and analyzes of physics performance

The new IQPET-GTU building

- We got a new space for research purposes, which will give us the opportunity to successfully participate in the DUNE experiment
- 1000 m^2 are is dedicated to ~~build new infrastructure~~
- Laboratories and smart workshop for a fast prototyping

GTU workshop

In the GTU we have facilities and machine shops for even complicated mechanical work. Also all necessary tools for a fast prototyping and R&D, including power supplies, VME DAQ system and huge spectra of NIM electronics.

The GTU has good and close contacts with the industry, which can easily be used for the manufacture of mechanical parts for the DUNE.

Thank you for attention!