





# WG 5.2.1 Meeting Simulation - Phase-I

October 6th 2022  
Marco Leite (USP)

# WG 5.2.1 Simulation Phase-I

## Minutes from 29 Sept. 2022 meeting

 **Organization (M. Leite) :** Hide   

- See slides in introduction;
- we will follow all issues on gitlab (targets and deadlines);
- people need to have an Indico account to upload material to the agenda - please act
- please create a branch with your name for your working version and request merge when OK.
- next meeting will be on Thursday Oct. 6th 15:20 - 16:20 due to conflicts
- Moving to Gitlab Ultimate (ed. License). Invitations will be sent and development will switch to this instance

**TCAD Simulation (R. Buhler):**

- Success opening TCAD geometry for AC-LGAD example sent by Taylor (UCSC)
- Problems reported running the field simulation
- M. Leite sent email to Taylor @UCSC putting R. Buhler and R. Giacomini in contact for debugging this issue

**Geant4 Simulation (M. Morales):**

- Geant4 v. 11.x is working (see figure attached)
- First example running on GDML geometry based on Taylor AC-LGAD TCAD files information - we need to verify the consistency
- Using a non-optimized physics process for fotons @ keV energy range. M. Morales will switch to this new process as next step
- Data will be saved as a root file . Proposed format for each event is (x,y,z,Q,process). This can be changed or converted to anything to be passed to TCAD
- First simulations will use monochromatic beam : 1keV to 30 keV in steps of 1 keV
- Beam will have no divergence for now
- Beam to enter from strip side
- World volume material is air. This may need to change for low energy X-Rays (vacuum) .
- Low priority: Review GDML to include loop structures and replications (this is only supported in Geant, so it needs a working example to debug)

**Action items (for next meeting on Oct. 6th). These will be issues on Gitlab and we will follow the discussion there .**

- TCAD Simulation (R. :
  - Solve the TCAD simulation issue for electrical field with Taylor's help (R. Buhler)
  - Extract E field for AC-LGAD baseline example on gitlab (R. Buhler)
  - Validate simulation against Taylor's results.(R. Buhler)
  - Aiming to present and discuss the results on next meeting (providing the issue is solved) (R. Buhler)
- Geant4 Simulation :
  - Update the physics model for low energy photons (keV) (M. Morales)
  - Save the data as Root format for first evaluation (see above) (M. Morales)
  - Read the Root file , provide comments and extract information (M. Leite, M. Morales)
- **Provide registration in Indico as external user (for those without CERN account)**

M. Leite, 29/09/2022

# WG 5.2.1 Simulation Phase-I - Gitlab Issues

**Geant4** (3 issues)

- Save data in ROOT TTree format (Effort: Medium, Priority: High, Status: New)
- Edit README.md (Effort: Low, Priority: High, Status: Oct 3)
- Push current version to gitlab (Effort: Low, Priority: High, Status: Today)

**TCAD** (4 issues)

- Explore the AC-LGAD first example in Sentaurus (UCSC) (Effort: Medium, Priority: High, Status: Feature New)
- Generate electrical field for the AC-LGAD structures from Taylor's example (Effort: Medium, Priority: Blocking, Status: Today)
- Contact Taylor to understand error in his example (Effort: Low, Priority: Blocking, Status: Oct 4)
- Extract geometry information for Taylor AC-LGAD example file (Effort: Low, Priority: High, Status: Oct 4)

**KDetSim** (1 issue)

- Fix compilation errors (Effort: High, Priority: Medium, Status: Nov 3)

**OPEN**

- Push current version to gitlab (usp9/UFSD/simulation/geant4-simulations#9) - created 4 days ago by Marco Leite (Oct 6, 2022) - updated 4 days ago (Effort: Low, Geant4, Priority: High)
- Edit README.md (usp9/UFSD/simulation/geant4-simulations#8) - created 4 days ago by Marco Leite (Oct 3, 2022) - updated 4 days ago (Effort: Low, Geant4, Priority: High)
- Fix compilation errors (usp9/UFSD/simulation/kdetsim#1) - created 4 days ago by Marco Leite (Nov 3, 2022) - updated 4 days ago (Effort: High, KDetSim, Priority: Medium, Status: On track)
- Generate electrical field for the AC-LGAD structures from Taylor's example (usp9/UFSD/simulation/tcad-simulations#4) - created 4 days ago by Marco Leite (Oct 6, 2022) - updated 4 days ago (Effort: Medium, Priority: Blocking, TCAD)
- Extract geometry information for Taylor AC-LGAD example file (usp9/UFSD/simulation/tcad-simulations#3) - created 4 days ago by Marco Leite (Oct 4, 2022) - updated 3 days ago (Effort: Low, Priority: High, TCAD, Status: On track)
- Contact Taylor to understand error in his example (usp9/UFSD/simulation/tcad-simulations#2) - created 4 days ago by Marco Leite (Oct 4, 2022) - updated 3 days ago (Needs attention, Effort: Low, Priority: Blocking, TCAD)
- Save data in ROOT TTree format (usp9/UFSD/simulation/geant4-simulations#7) - created 4 days ago by Marco Leite (Oct 6, 2022) - updated 3 days ago (On track, Effort: Medium, Feature New, Geant4, Priority: Medium)
- Validate advanced GDML Geometry construction (usp9/UFSD/simulation/geant4-simulations#2) - created 1 week ago by Marco Leite (Oct 27, 2022) - updated 9 minutes ago (Needs attention, Effort: Medium, Feature New, Geant4, Priority: Medium)
- Explore the AC-LGAD first example in Sentaurus (UCSC) (usp9/UFSD/simulation/tcad-simulations#1) - created 1 month ago by Marco Leite (Oct 6, 2022) - updated 3 days ago (Needs attention, Effort: Medium, Feature New, Priority: High, TCAD, Status: Initial configuration and development)

**CLOSED**

- Select Physics Process for Low Energy X-Rays (usp9/UFSD/simulation/geant4-simulations#6) - created 4 days ago by Marco Leite (Oct 6, 2022) - closed 1 day ago (On track, Effort: Low, Feature Update, Geant4, Priority: High)
- Geant4 GDML first skeleton example of AC-LGAD (usp9/UFSD/simulation/geant4-simulations#1) - created 3 weeks ago by Marco Leite (Oct 6, 2022) - closed 4 days ago (Needs attention, Effort: Medium, Feature New, Priority: High)