11th International "Hiroshima" Symposium on the Development and Application of Semiconductor Tracking Detectors (HSTD11) in conjunction with 2nd Workshop on SOI Pixel Detectors (SOIPIX2017) at OIST, Okinawa, Japan

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TCAD for SOIPIX

Monday 11 December 2017 16:20 (30 minutes)

TCAD simulation is an important tool to understand, design, and evaluate SOIPIX-like devices. In this talk, it is introduced as follows.
- General introduction
 Process simulation
 Device simulation
- Some important TCAD aspects for SOIPIX
 Physical model
 Mixed mode
- Detailed explanations of a simple case study simulation
- Review of some applications to SOIPIX-like devices

After that two recent topics are introduced.
- Automatic differentiation
In order to incorporate new materials, new principles into electronics, much more new physical models are required to be implemented into the device simulator. For numerical convergence of Newton loop in the device simulator, Jacobian matrix elements are necessary, which are automatically incorporated by the automatic differentiation method.
- Domain decomposition method
In order to analyze very large scale problems such as SOIPIX, the numerical matrix to be solved becomes too large. The domain decomposition method is studied on the high performance computing environment in order to reduce the total size of the numerical matrix.
Examples of these new features are also presented.

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