Silvaco

An Overview

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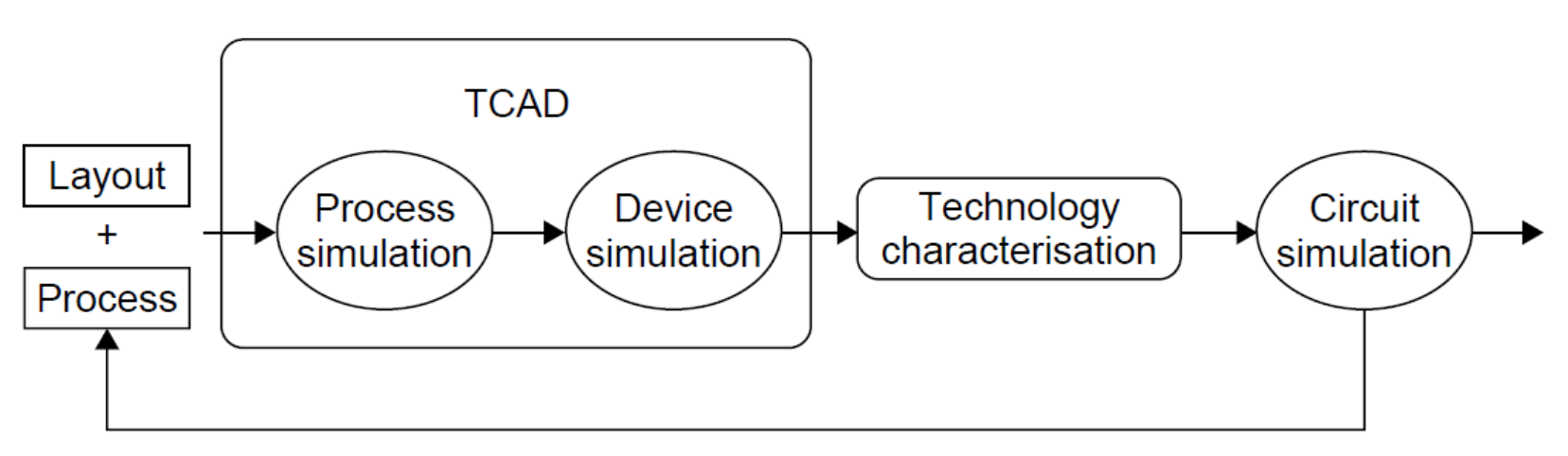
TCAD Based Simulation



TCAD Based Simulation

- Simulating fabrication process and device analysis of Electronic devices.
- Various optoelectronics devices: BJT, MOSFET, HBT, HEMT, Solar cell, LED, Laser,… .
- Saves money and time.

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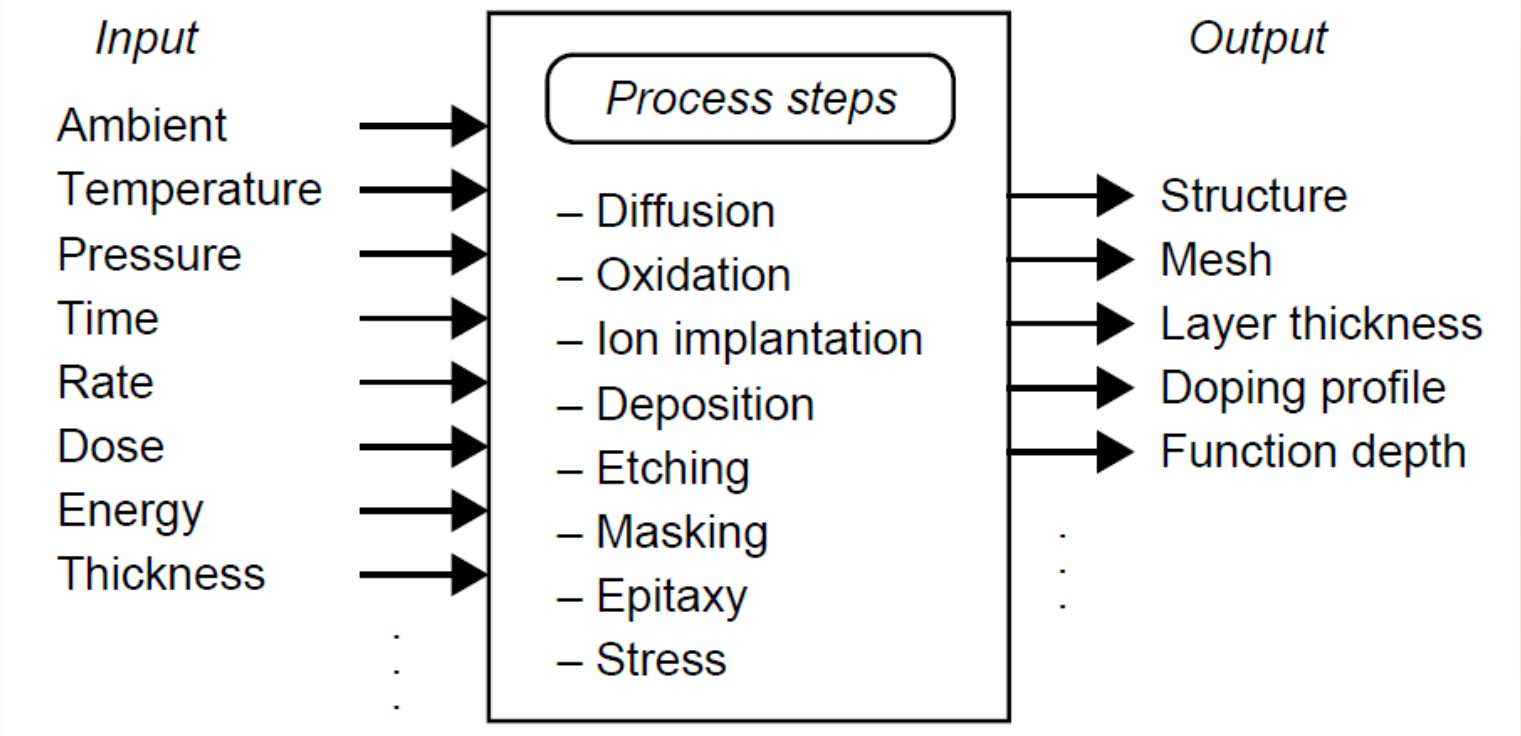
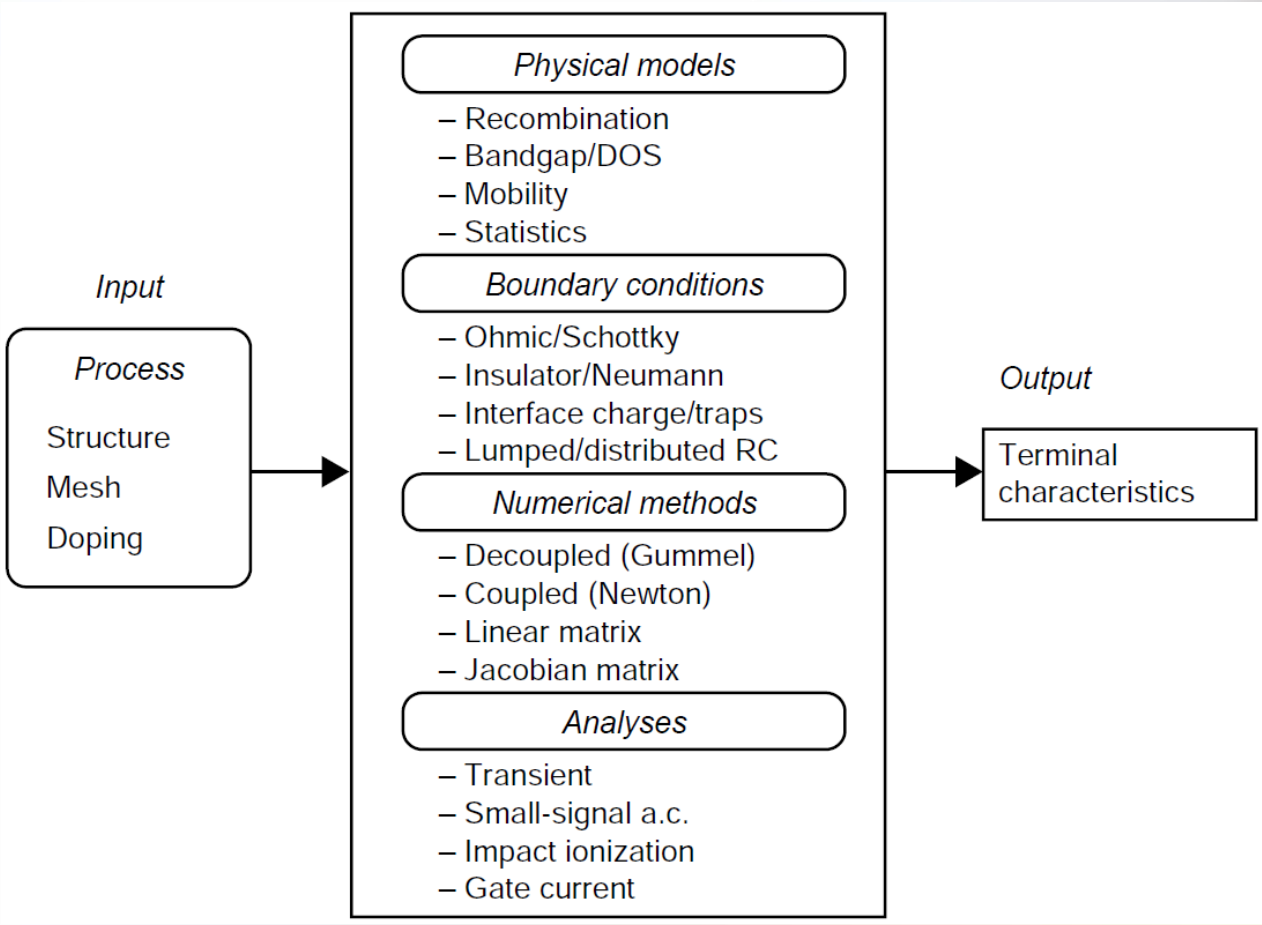
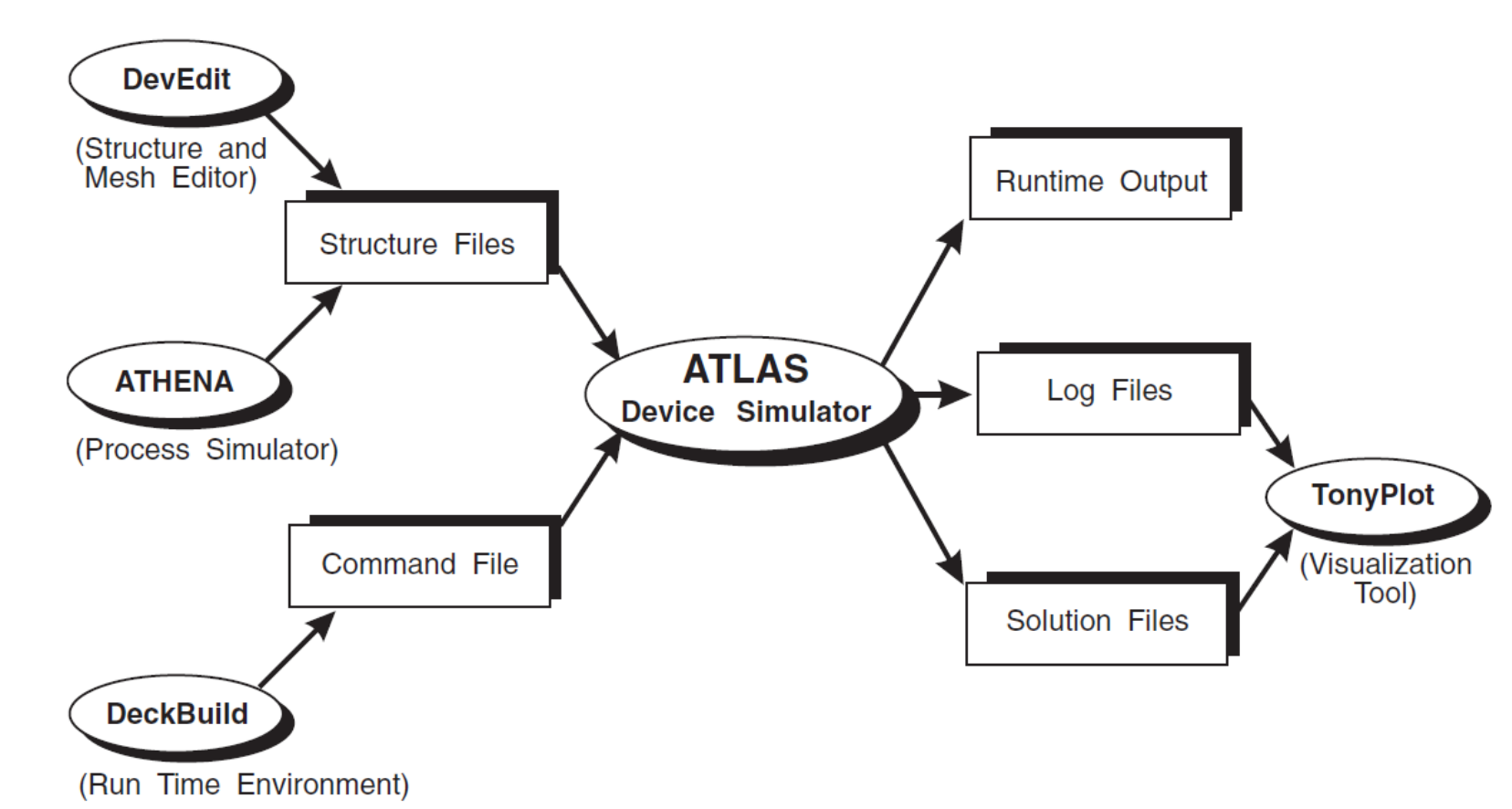
Process simulation



Device simulation

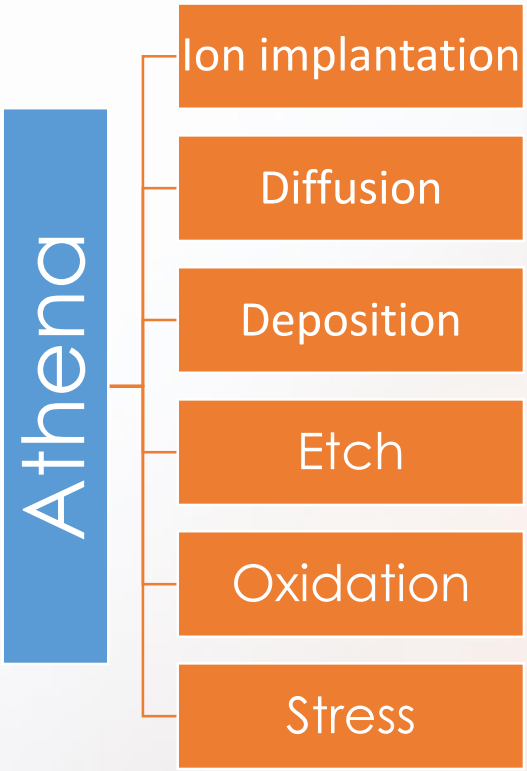


Silvaco's TCAD



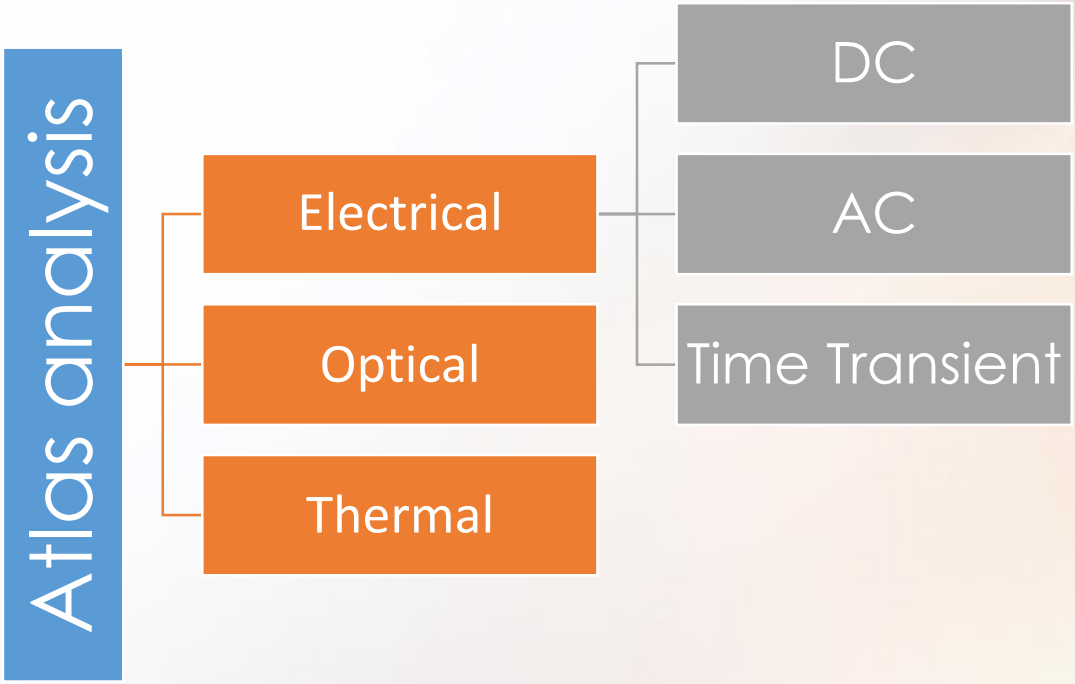
Athena

- Physically-based 2D processing simulator.



Atlas

- Physically-based 2D and 3D device simulator.



Silvaco Syntax

- Both Atlas and Athena should be run through Deckbuild.

- Each Atlas run should start with:

go atlas

and Athena is run with:

go athena

Silvaco Syntax

- Each statement consists of a keyword and a set of parameters:

<STATEMENT> <PARAMETER>=<VALUE>

- Example:

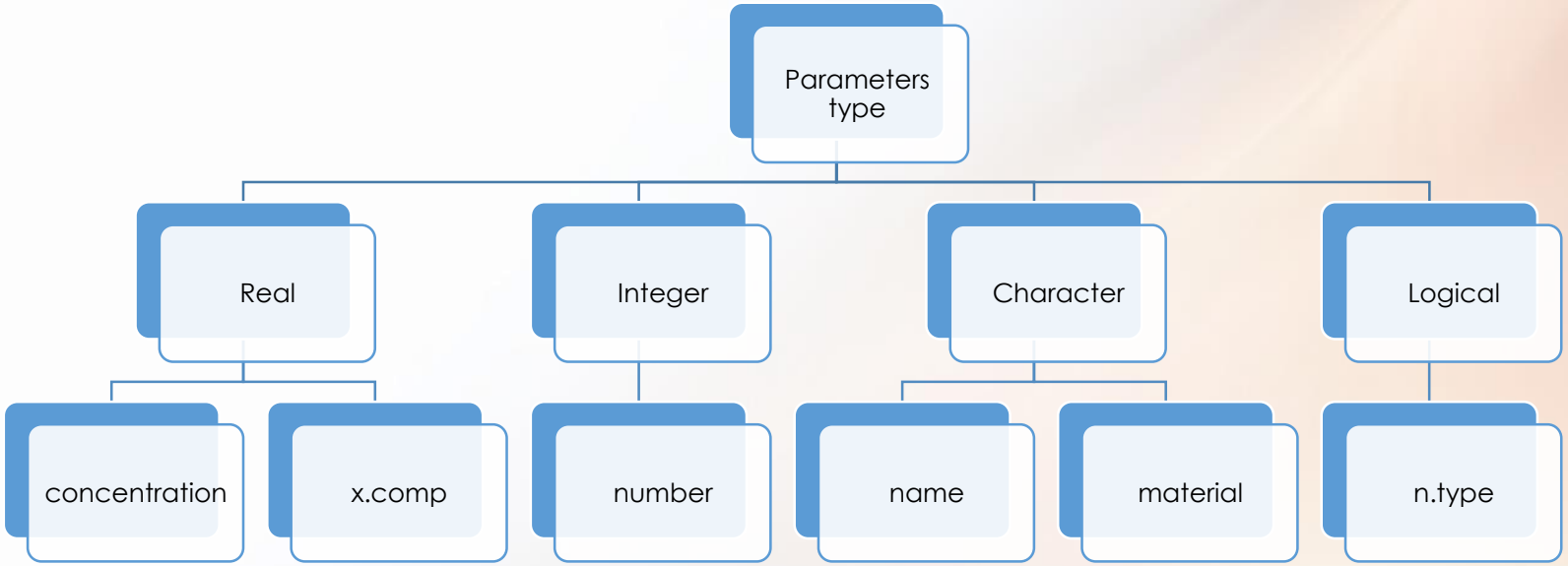
DOPING UNIFORM N.TYPE CONCENTRATION=1.0e16 REGION=1 OUTFILE=my.dop

Silvaco Syntax

- Enough to use few letters of a parameter name (should be distinguishable from any other parameters):
  - CONCENTRATION can be shortened to CONC.
  - REGION can't be shortened to R, since there's a parameter called RATIO.

Parameters

- Four different types for the <VALUE> parameter: Real, Integer, Character, and Logical.



Silvaco Syntax

- Silvaco is not case sensitive!
- The \ character at the end of a line indicates continuation.
- Comments are indicated by the COMMENT statement or a number sign (#)

Useful Reference Sources

1. G. Armstrong and C. Maiti, *TCAD for Si, SiGe and GaAs integrated circuits*. The Institution of Engineering and Technology, 2007.
2. *Atlas User's Manual*. Silvaco, 2016.
3. *Athena User's Manual*. Silvaco, 2014.
4. *Deckduild User's Manual*. Silvaco, 2016.
5. *Tonyplot User's Manual*. Silvaco, 2014.

More about Silvaco TCAD

- http://ucourse.ir/open-courses/silvaco/