

# DMT - Python Toolkit for DeviceModeling

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# Outline

- Motivation and introduction
- DMT-core (with live demonstration)
- DMT-extraction (with live demonstration)



# Motivation and introduction

Tasks faced by device/modeling engineers:

- dealing with large quantities of data
- using mathematical optimization
- interfacing measurement equipment
- interfacing circuit/TCAD simulators
- dealing with complicated model equations
- documentation of extraction results
- sharing of extraction (single steps or full flows) not common currently

=> **These are mostly software problems!**



# DMT-core

- offers routines for bulk measurement read-in and data management using Pandas
- enforces unified “grammar” for electrical quantities and data conversion routines
- provides interfaces to popular circuit simulators
- offers a simulation controller for parallel and/or remote simulations
- handles modelcards including Verilog-AMS source codes (using verilogae/OpenVAF)
- allows automatic documentation of measurements and simulations using PyLatex
- is open-source and can be obtained from: <https://gitlab.com/dmt-development/dmt-core>
- our paper-DOI is: 10.21105/joss.04298

→ Live demo of ngspice, Xyce and ADS interface and simulation controller



# DMT-extraction

- will be open-source soon (thanks to nlnet: <https://nlnet.nl/project/DMT-Core/>)
- shall offer parameter extraction module including base classes for extraction control
- is thought and implemented with extraction documentation
- will offer a GUI
- shall make extractions repeatable, documented and verifiable
- is already in use for our HICUM extractions (TUD and SemiMod, not included)
- will include a FET (BSIM or EKV) extraction flow

→ Live demo of sEKV-extraction

# Discussion points

- Do you have any questions regarding DMT-core and DMT-extraction?
- Do you have any requests to be implemented?
- Which technology and example measurement data for DMT-extraction?
- Which FET model?

# Thank you

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