

# **HICUM User's Meeting**

**September 30, 2001**

**Minneapolis, MN**

**Marriot City Center, LeCroix II Room, 7-9 pm**

Accurate modeling of Si and SiGe bipolar transistors has become one of the bottlenecks for designing high-speed/high-frequency circuits for, e.g., wireless and fibre-optic applications. The advanced compact bipolar transistor model HICUM has been developed to address these issues.

A HICUM user's meeting was held to provide a technical forum for device modeling and circuit design engineers, that are applying or are interested in using HICUM, for exchanging information on and discussing aspects of the model that are relevant to their work.

A number of short presentations were made, that centered around model parameter extraction as the most important issue for industrial model users. Various methods and implementations for extracting the HICUM model parameters were proposed by representatives from different companies and universities. An effort to pool the procedures in ICCAP is underway.

Due to the tragic events of September 11 not every presentation could be given in person, but a softcopy of all presentations can be obtained from [http://www.iee.et.tu-dresden.de/iee/eb/eb\\_homee.html](http://www.iee.et.tu-dresden.de/iee/eb/eb_homee.html).

## Agenda

7:00 - 7:15 Welcome and HICUM status overview

7:15 - 8:30 User contributions

T. Zimmer / B. Ardouin, "HICUM parameter extraction in ICCAP"

J. Berkner, "Proposal for transit time parameter extraction"

R. Murty / J. Johnson / D. Hame, "Results for IBM's SiGe foundry process"

W. Kraus, "Results for Atmel's SiGe foundry process"

M. Schroter, "Self-consistent Transit time determination from transit frequency"

D. Berger / D. Celi, "A novel method for transit time parameter extraction taking into account the coupling between DC and AC characteristics"

D. Celi / D. Berger, "Direct extraction of base-collector weak avalanche HICUM model parameters",

F. Lin, "HICUM Model extraction in ICCAP with multi DUT and build-in functions"

8:30 - 9:00 General discussion

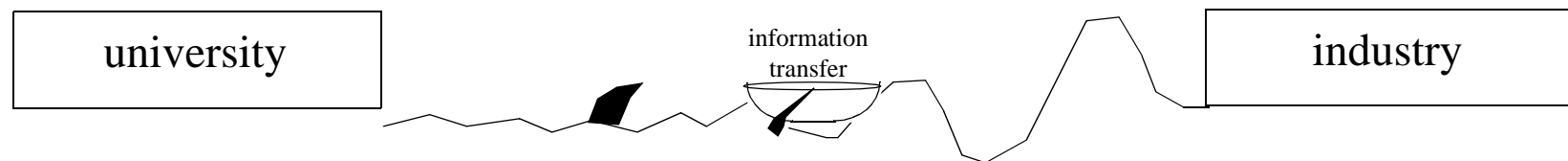
Suggestions for further development

## Purpose of this user's meeting

- model parameter extraction (main bottleneck for application of a new model)
  - presentation of available results and solutions
  - test structures
  - clarify questions
- a forum for "free" *technical* discussion and exchange of information
  - mostly parameter extraction related (= nature of company business)
  - is a common (not necessarily standardized) model parameter extraction methodology desirable ?
  - is a common set of test structures and measurement procedures available and desirable ?
  - model enhancement recommendations
- clarification of questions regarding HICUM
  - model formulation: physical background and limitations, mathematically
  - status: model development and availability
- clarification of the role of a university ...

## Role of university

- work *must*
  - have sufficient research (theory and experiment) contents to qualify for theses
  - not be just a service effort in order to avoid law suits
- implementations *must not require* significant manpower  
examples: GUI, coding in several simulators, ...
- release/deployment *must not require*
  - significant maintenance effort
  - obligations and responsibility for functionality other than developed (special) case
  - legacy and versioning issues



- For the productization efforts mentioned above a separate engineering position (preferably a post-doc) is required and has to be funded by industry