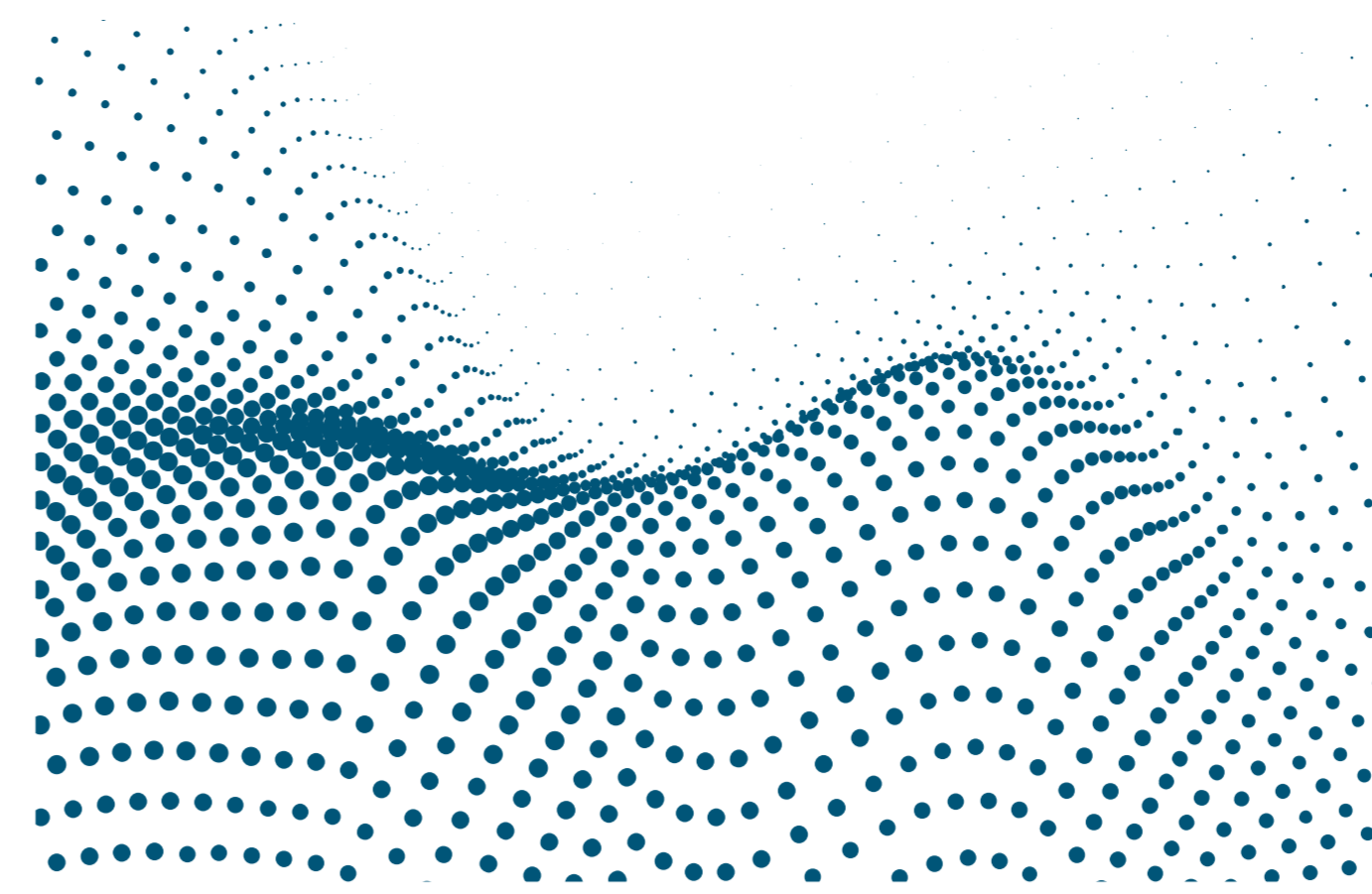## Universität Stuttgart

Institut of Robust Power Semiconductor Systems

Simon Haußmann, Ingmar Kallfass
Simon.haussmann@ilh.uni-stuttgart.de
ingmar.kallfass@ilh.uni-stuttgart.de

Pfaffenwaldring 47, D-70569 Stuttgart

Open6GHub

Open6G-Hub - In-loop digital Predistortion for 6G-Data Transmission

Research/Master Thesis:

In communication sytems digital predistortion can be used to enhance the signal quality, while the power amplifier is driven in saturation. The goal is to research on digital predistortion algorithms for state of the art THz-Tranceivers

Tasks

- **Setup and Implementation of FPGA-based Sender/Receiver System**
- **Correlation of sent data and received data in digital domain. Implementation of real-time control loop for Sender/Feedback Syncronisation**
- **Real time analysis of channel performance with digital algorithms**
- **Implementation of Real-Time Predistortion Algorithms without use of external computation („in-loop")**

Goals

- **In-loop Predistortion using different DUTs. Experiments also in E-Band (60GHz – 90GHz) and H-Band (220GHz-325GHz possible.**
- **Comparison of In-loop Predistortion using different non-linear models with different memory effects.**
- **Comparison of In-loop Predistortion using different algorithms**
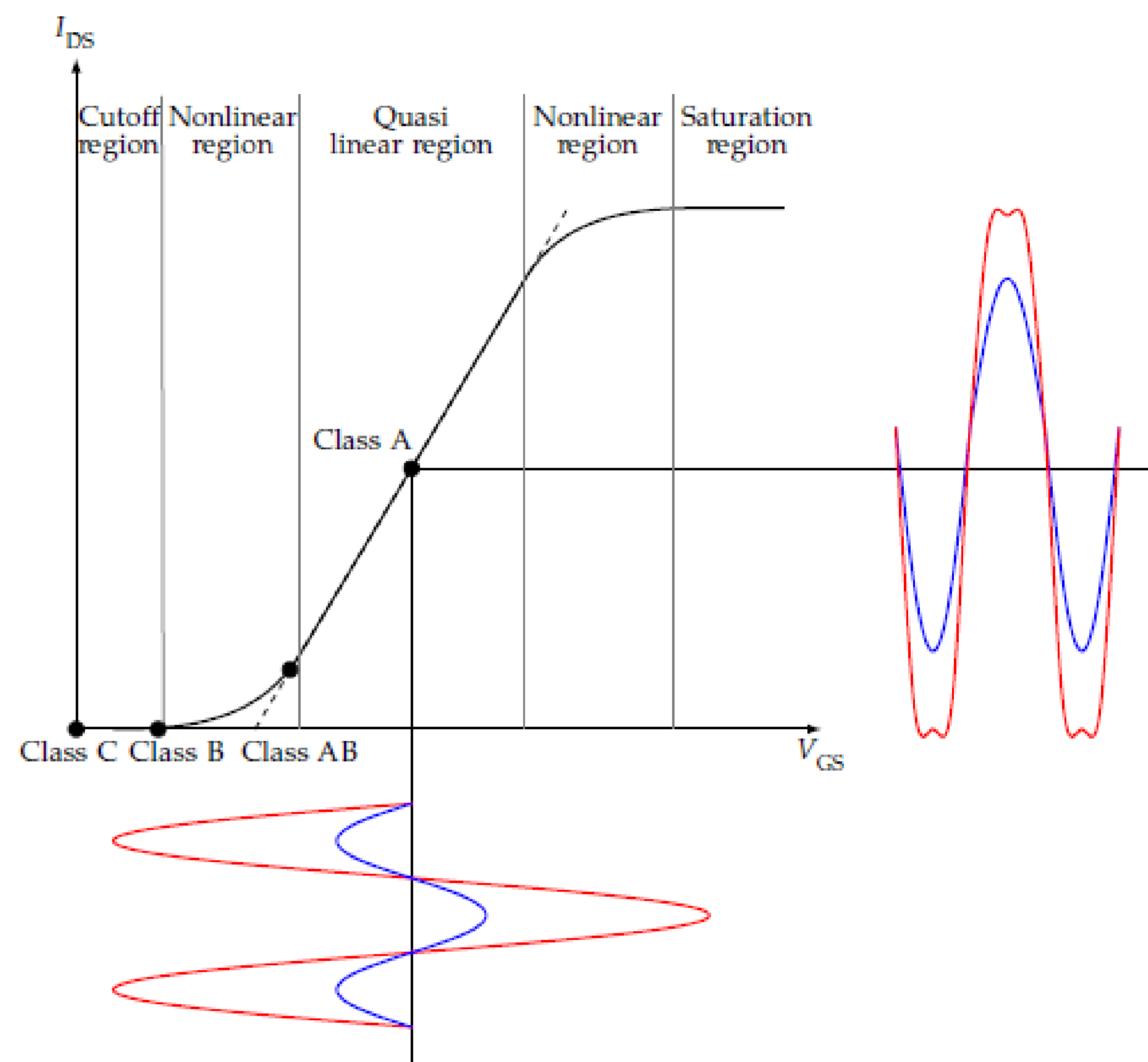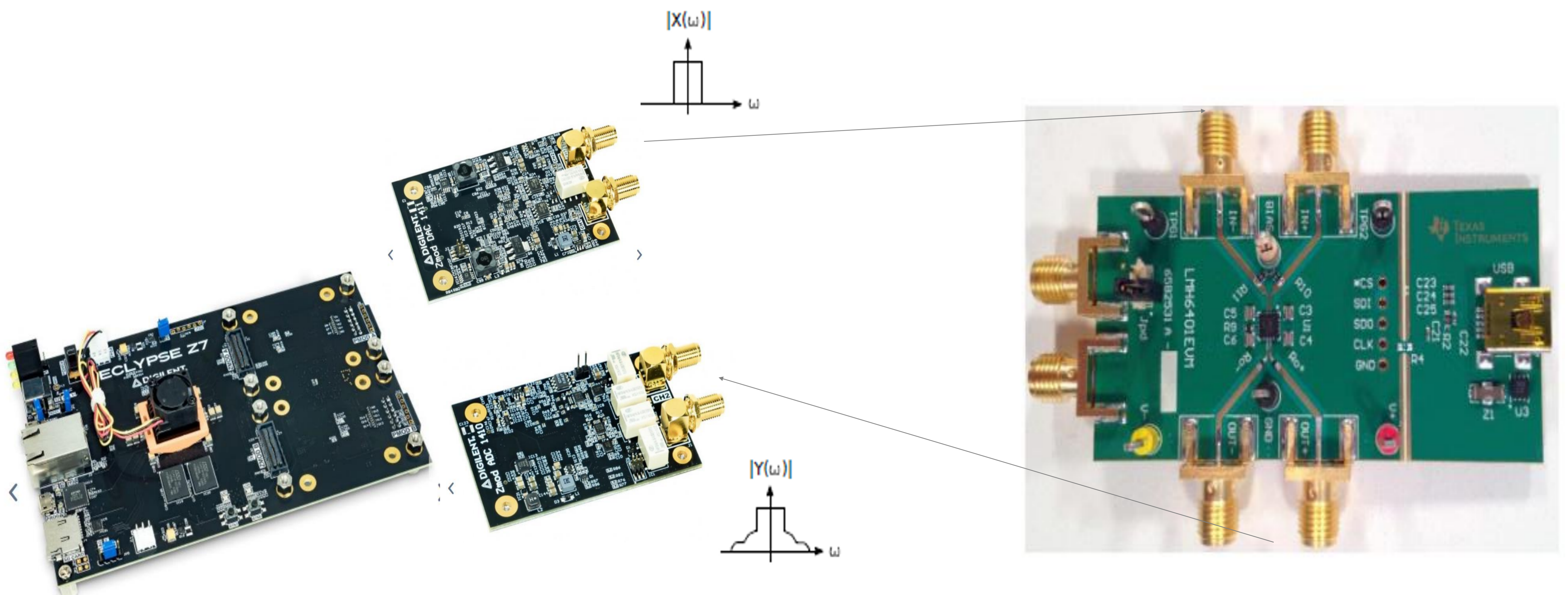

Figure 2.2.: This plot shows typical nonlinear PA transfer characteristics with focus on gain compression. The input signals are shown at the bottom whereas the amplified output signals are shown on the right. Adopted from [Kal18,Cri02].

Amplifier distortion due to class AB of amplifier

Proposed Setup for Inloop digital predistortion

https://www.ilh.uni-stuttgart.de/en/research/mmw/Open6GHub/

05.09.2022