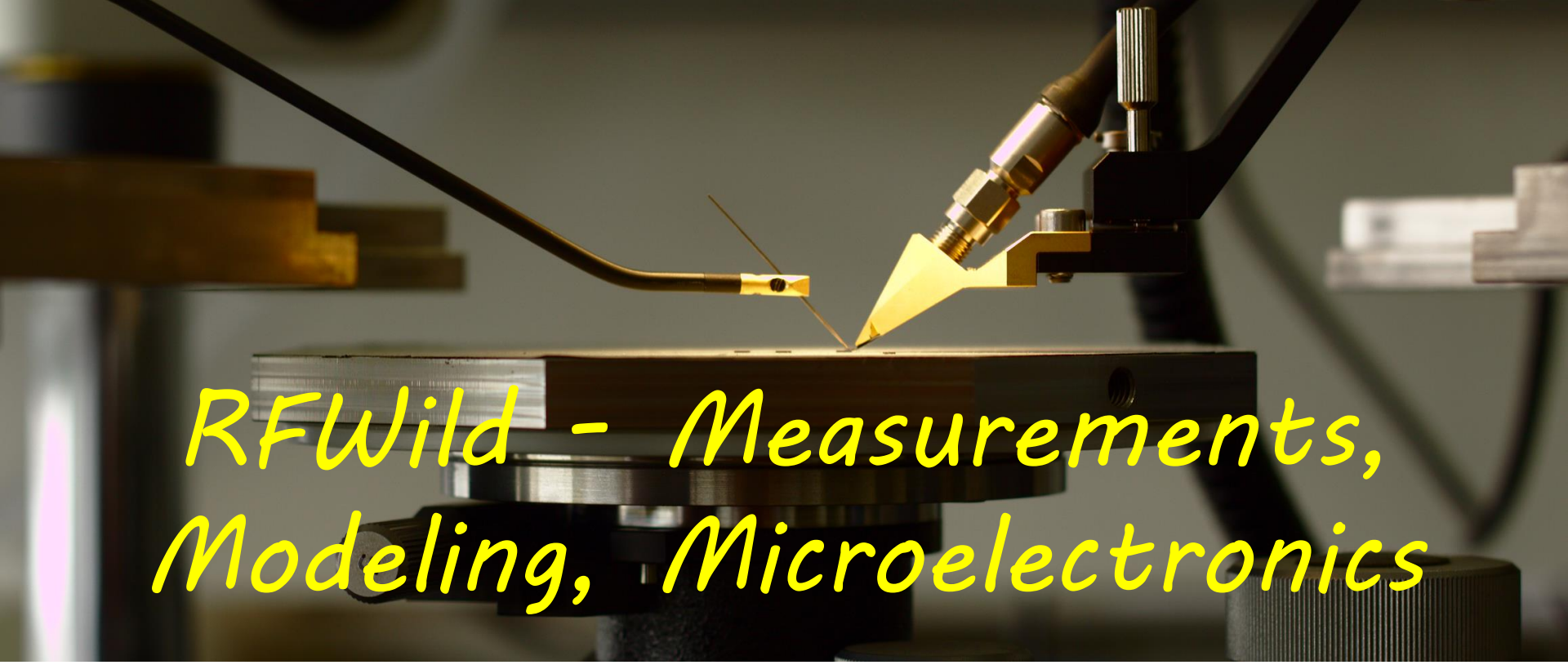

RFWild - Measurements, Modeling, Microelectronics

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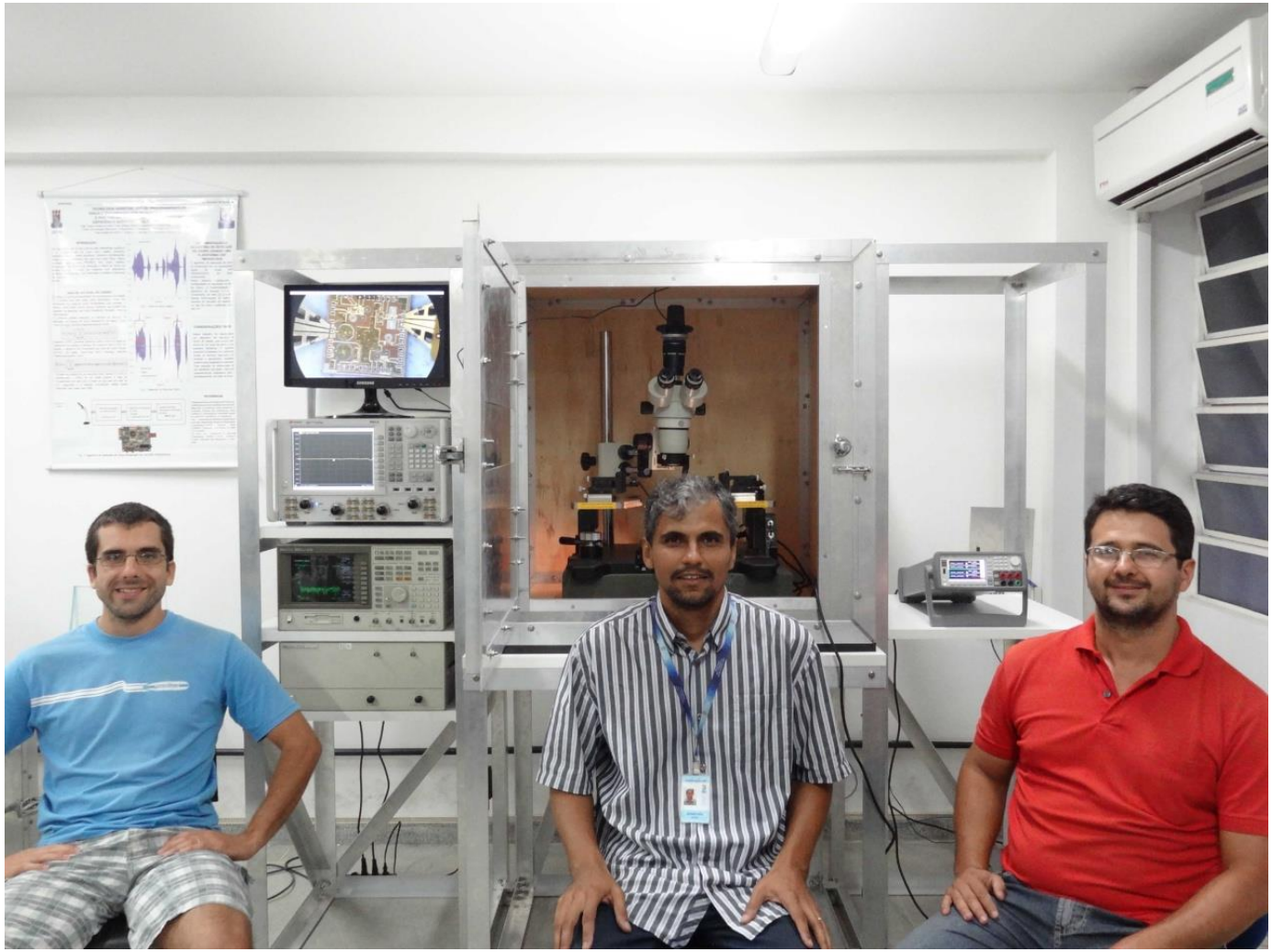
RFWild´s infrastructure

Outline

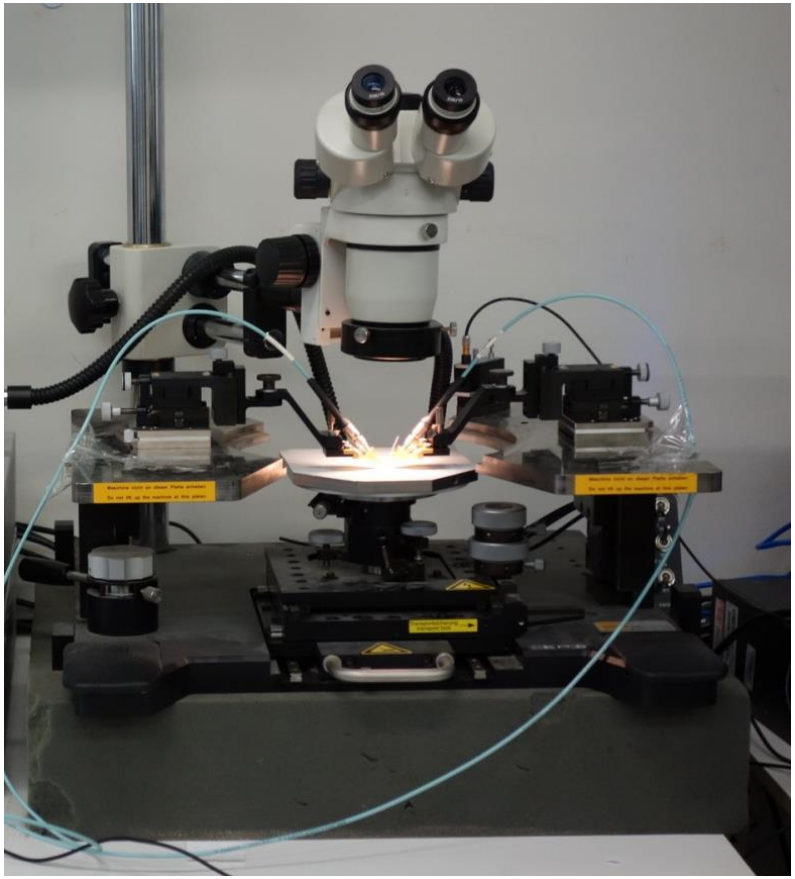
- Infrastructure at our disposal:
  - Wafer probe station
  - Noise measurements
  - S- and X-Parameters measurements
  - I x V measurements
- Summary of our knowledge and background

Infrastructure at our disposal

RFWild
Measurements & Microelectronics



Infrastructure at our disposal



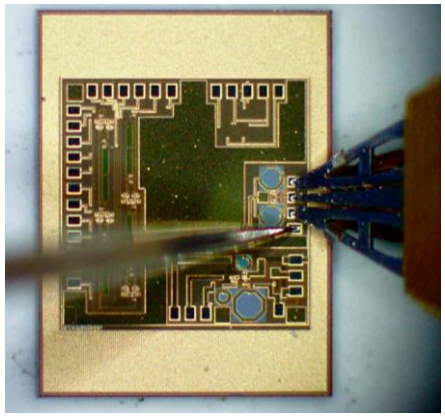
Suss EP6 Manual
wafer probe station

- 2 GSG 125 µm probes
- 2 DC probes
- 2 bias tees (.045-26 GHz)
- Calibration substrate and connections up to 50 GHz
- 2 GSGSG 125 µm probes being purchased

Infrastructure at our disposal

- Some of our probing photos:

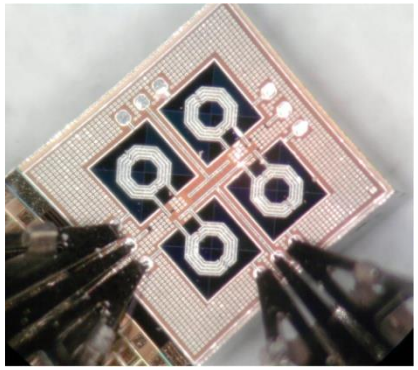
2.4 GHz Oscillator



DC probe

GSG probe

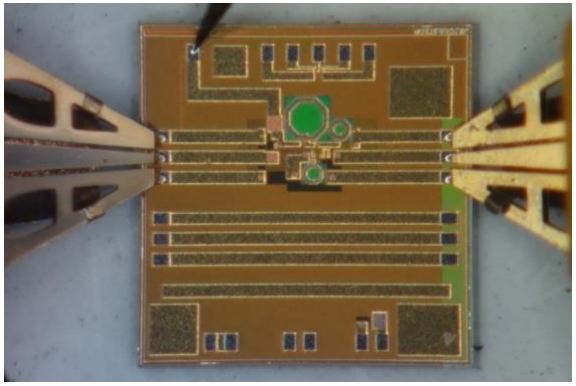
2.4 GHz VCO



GSG probe

GSG probe

DC probe **2.4 GHz LNA**

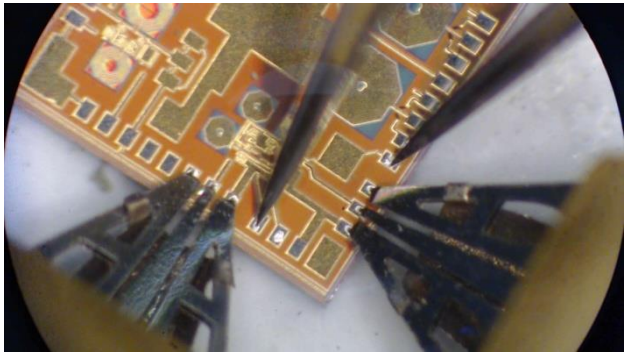


GSG probe

GSG probe

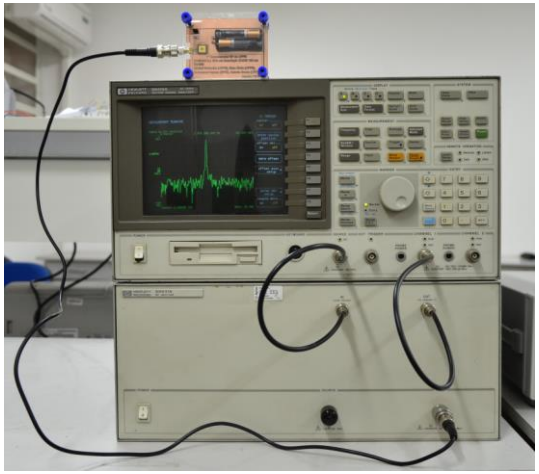
2.4 GHz Front-End

DC probe **DC probe**



GSG probe **GSG probe**

Infrastructure at our disposal



(Very good) signal analyzers:
DC – 10 MHz
2 MHz – 2.65 GHz
10 MHz – 13 GHz

LF differential amplifier:
16 Hz – 40 MHz

Keysight 346A (10 MHz – 18 GHz)
for LNA characterization

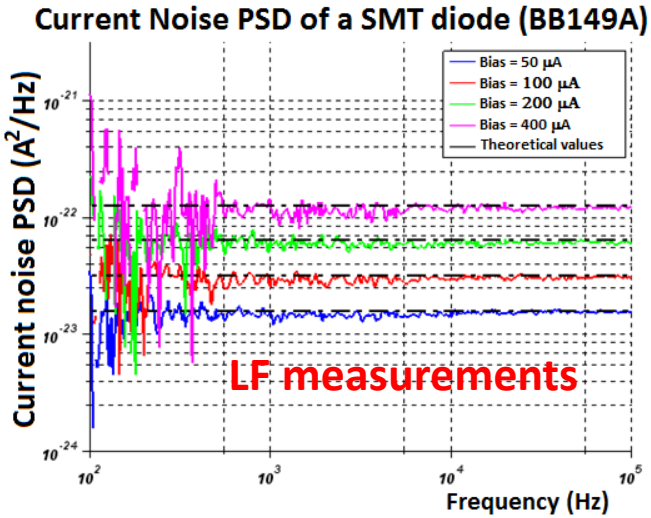
Infrastructure at our disposal

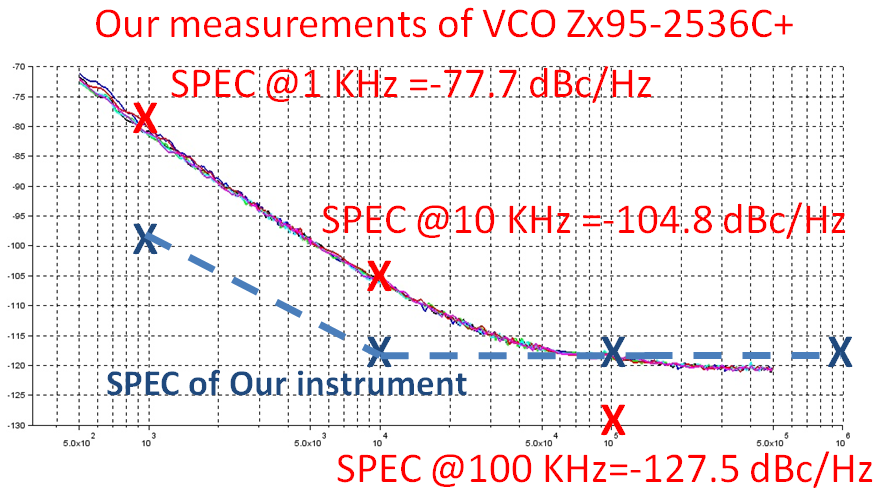
RFWild
Measurements & Microelectronics

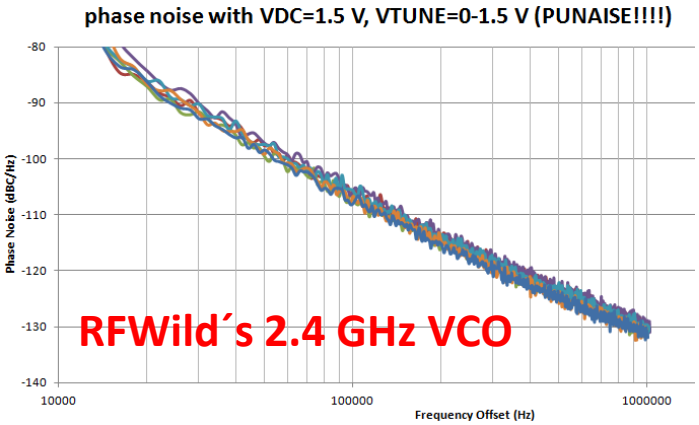
- LF (< 10MHz) noise measurements:
  - Flicker (1/f) noise measurements: quality of the cristaline structure; noise modeling in transistors
  - Noise floor: 0.5 nV/√Hz @ 100 KHz
- Phase noise measurements (<13 GHz):
  - PM demodulation or spectrum measurement.
  - Noise floors: -97 dBc@1 kHz; -120 dBc@10 kHz, -120 dBc@100 kHz; -132dBc@1 MHz; -146 dBc@10 MHz
- Noise figure measurements (<13 GHz):
  - NF as low as 1 dB!!

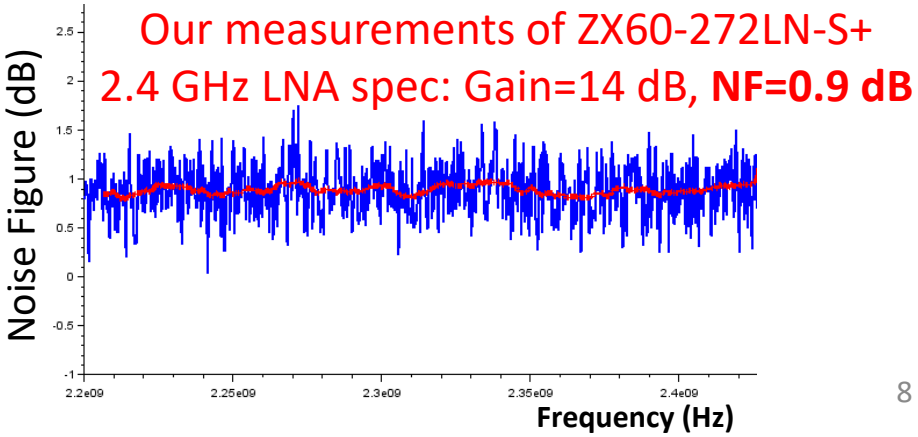
Infrastructure at our disposal

- Measurements done so far:

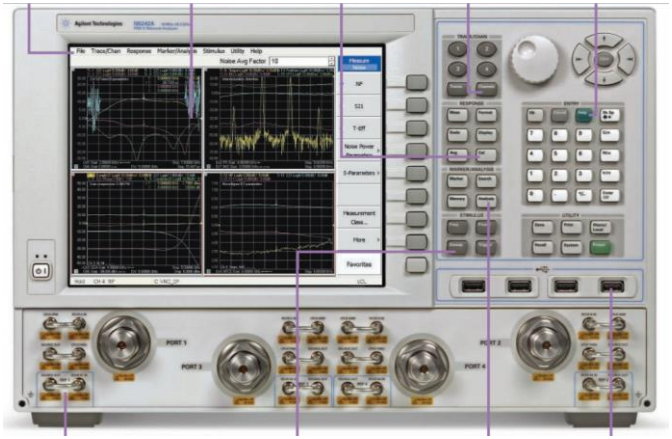








Infrastructure at our disposal



PNA-X 13.5 GHz 4-ports
(to the best of our knowledge, the 1st of its kind in Brazil)

Measurement capabilites: 4-ports linear (S) and nonlinear (X) characterization: Transformers, Differential Amplifiers, Power Amplifiers, Duplexers, Multiple Antenae Networks, ...

Infrastructure at our disposal

IxV tracer, 2 channels
DC/ pulsed

Measurement capabilites: 1- and 2-ports I x V characterization (DC and pulsed):

10^{-13} A ≤ CURRENT ≤ 3 A

10^{-6} V ≤ VOLTAGE ≤ 210 V

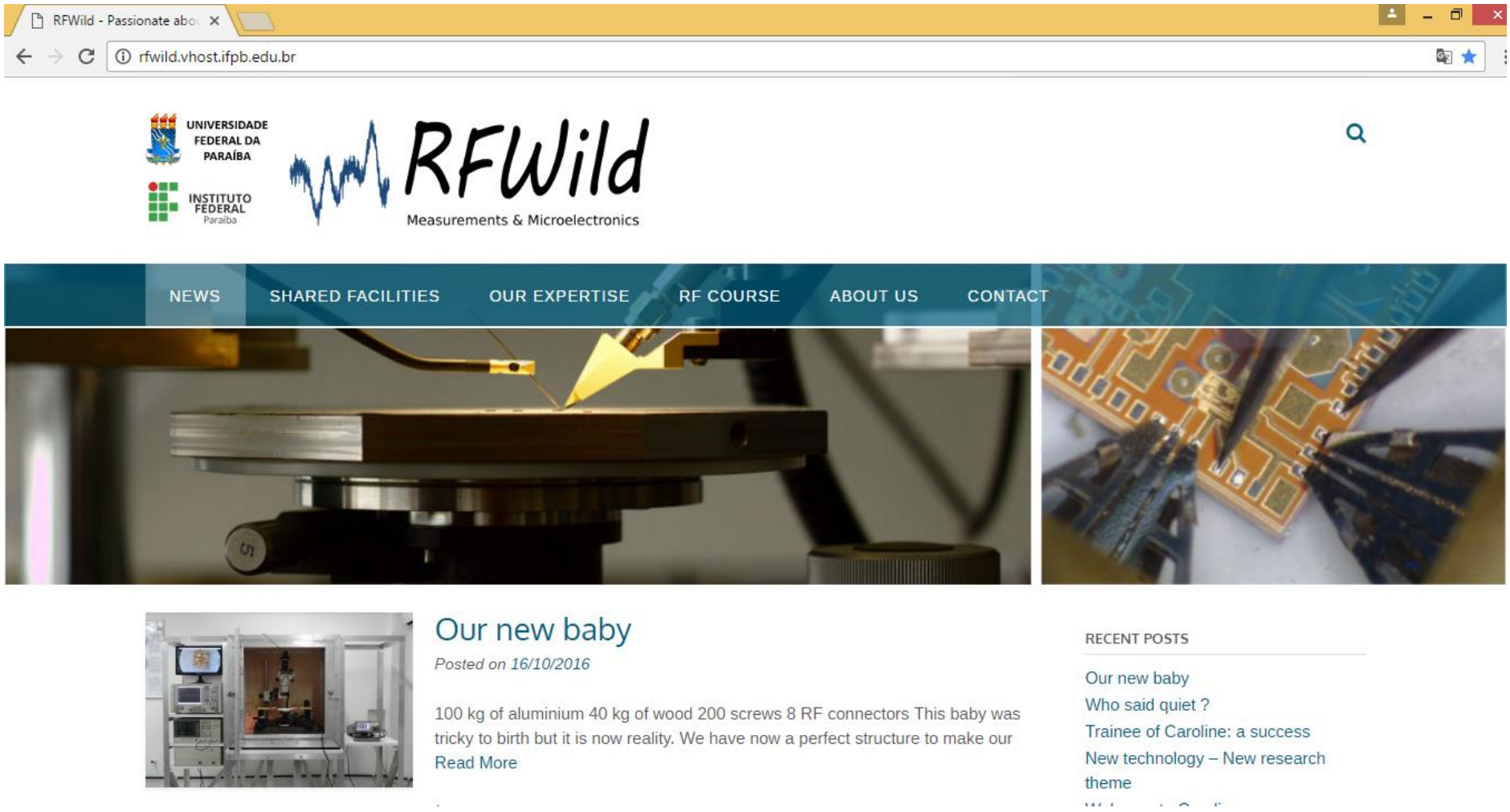
To be soon available: temperature controlled measurements!

Summary of our knowledge/background

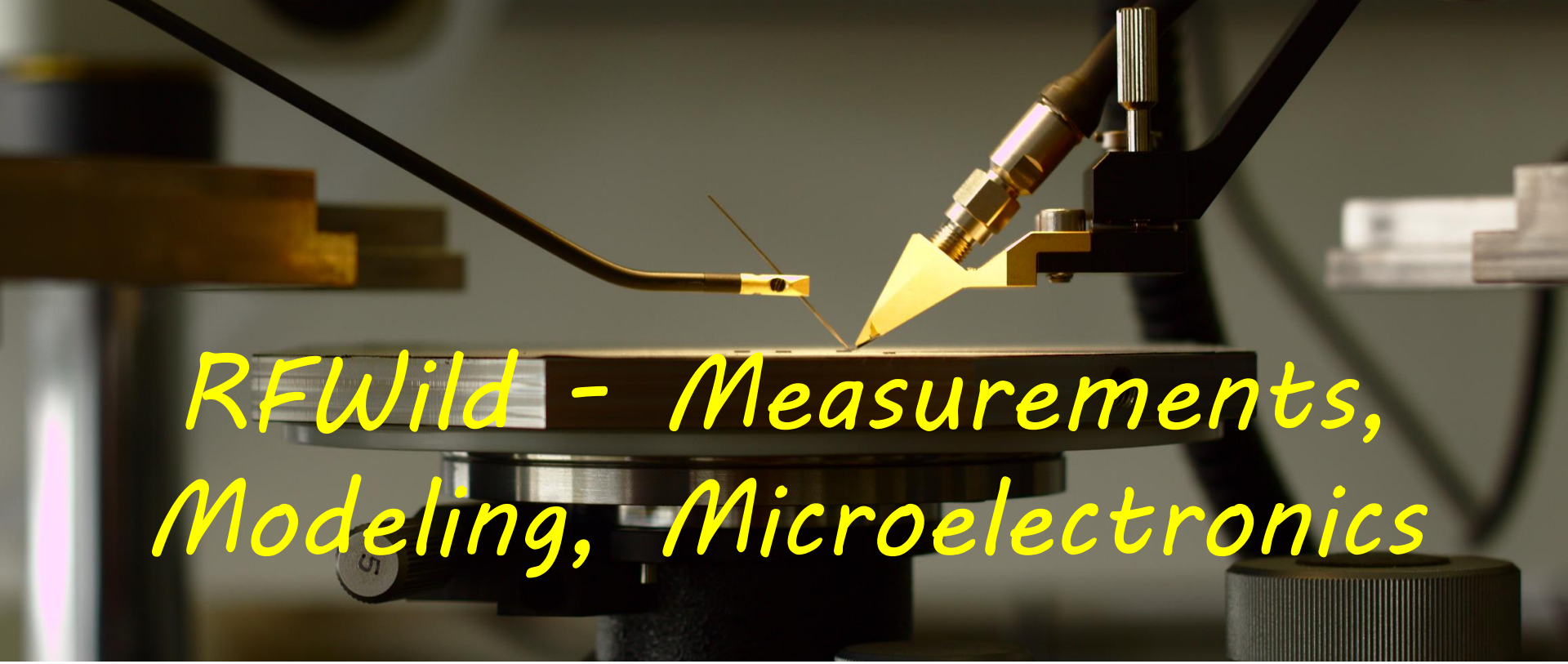
RFWild
Measurements & Microelectronics

- Characterization and modeling of passive devices: inductors, transformers, transmission lines, ...
- Characterization and modeling of active devices: Bipolar, MOS, HBTs,... Si, SiGe, GaAs, InP, ...
- Design of high FOM (Figure of Merit) LNAs, VCOs, Front-Ends (and going further and "*wilder*"...)

Our website



http://rfwild.vhost.ifpb.edu.br



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Thank you!