

Warsaw University of Technology  
Institute Electronic System

# **ELHEP Group - activities in TESLA**

<http://tesla.desy.de/~elhep>

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# ELHEP Group

Warsaw University of Technology  
Institute Electronic System

## **Team:**

About 20 people  
scientists, engineers and students  
(Ph.D. and M.Sc.) working at:  
Warsaw, CERN, DESY

# Experience

- **CERN, CMS**
  - Muon trigger
  - Data transmission system
  - Radiation tests
- **DESY, ZEUS, BAC detector**
  - Trigger
  - Readout
  - Diagnostic system
- **DESY, ZEUS, VETO detector**
  - Readout

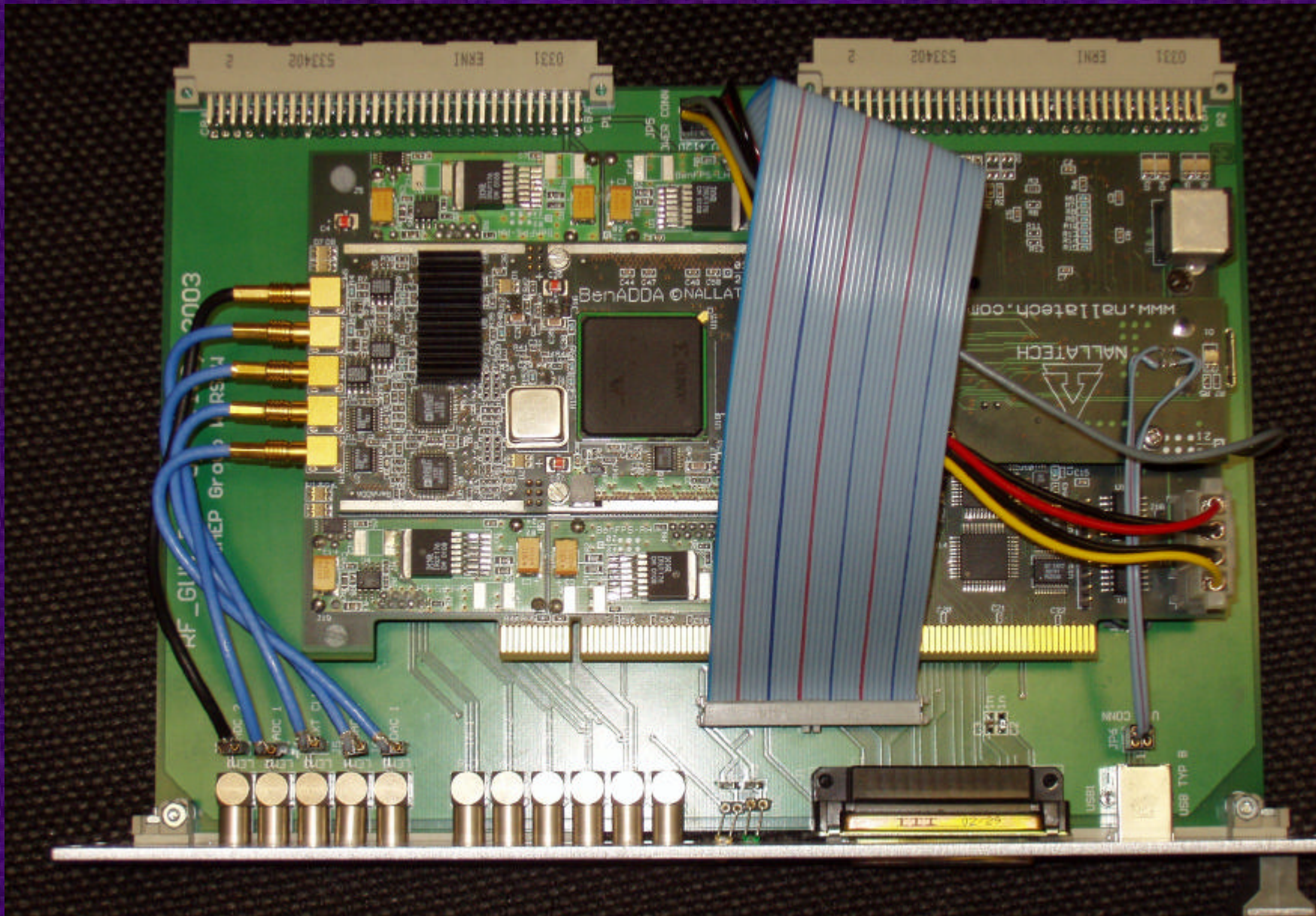
# Activity in TESLA

- **Cavity and RF GUN controller**
- **Cavity and RF GUN simulator**
- **Radiation tests**

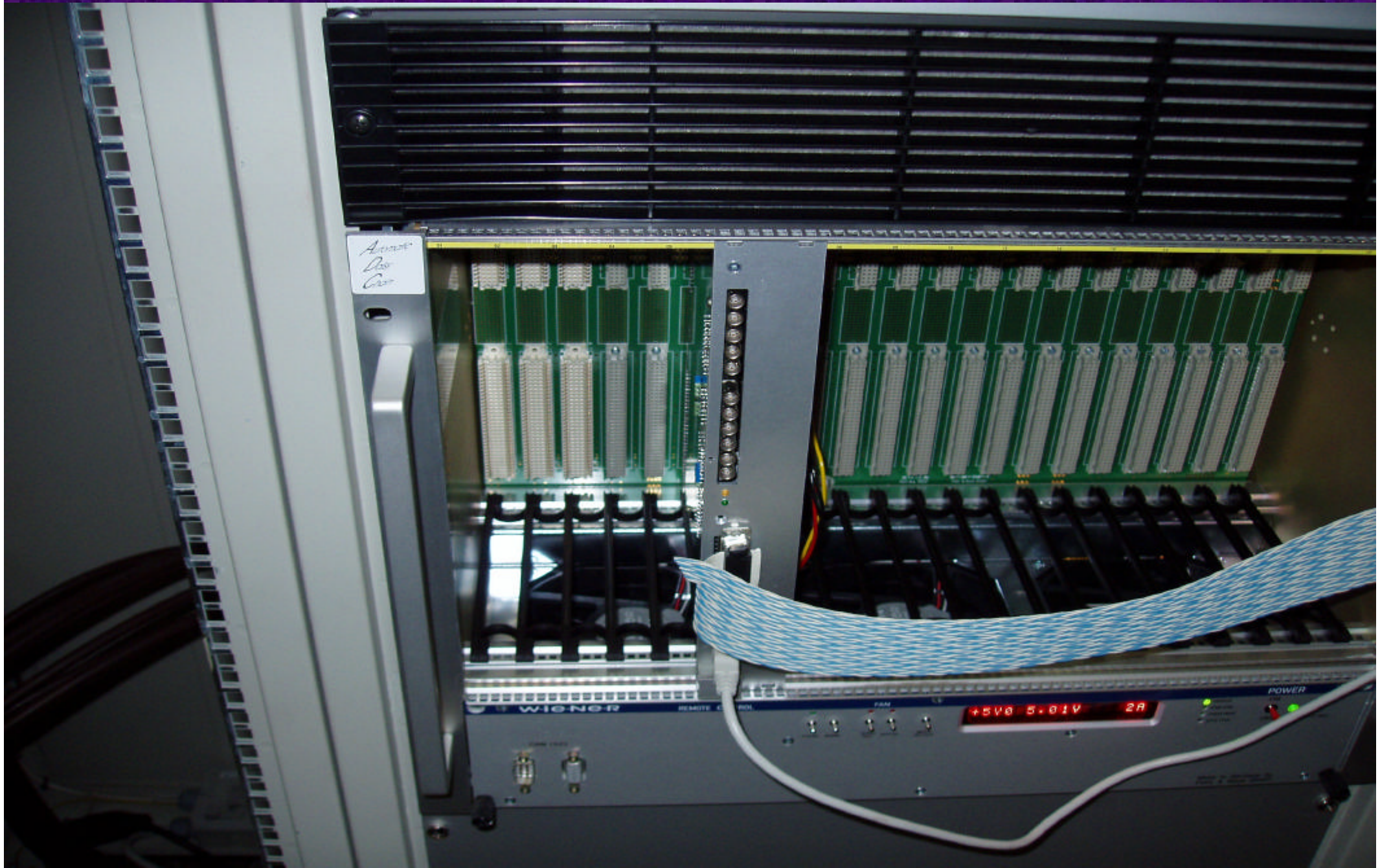
# Cavity and RF GUN controller

- **Based on FPGA XILINX Virtex 2**
  - Response < 100 ns (32 cavities)
  - Feedforward
- **Nallatech board**
  - 2 ADC @ 65 MHz
  - 2 DAC @ 65 MHz
  - Virtex XC2V3000

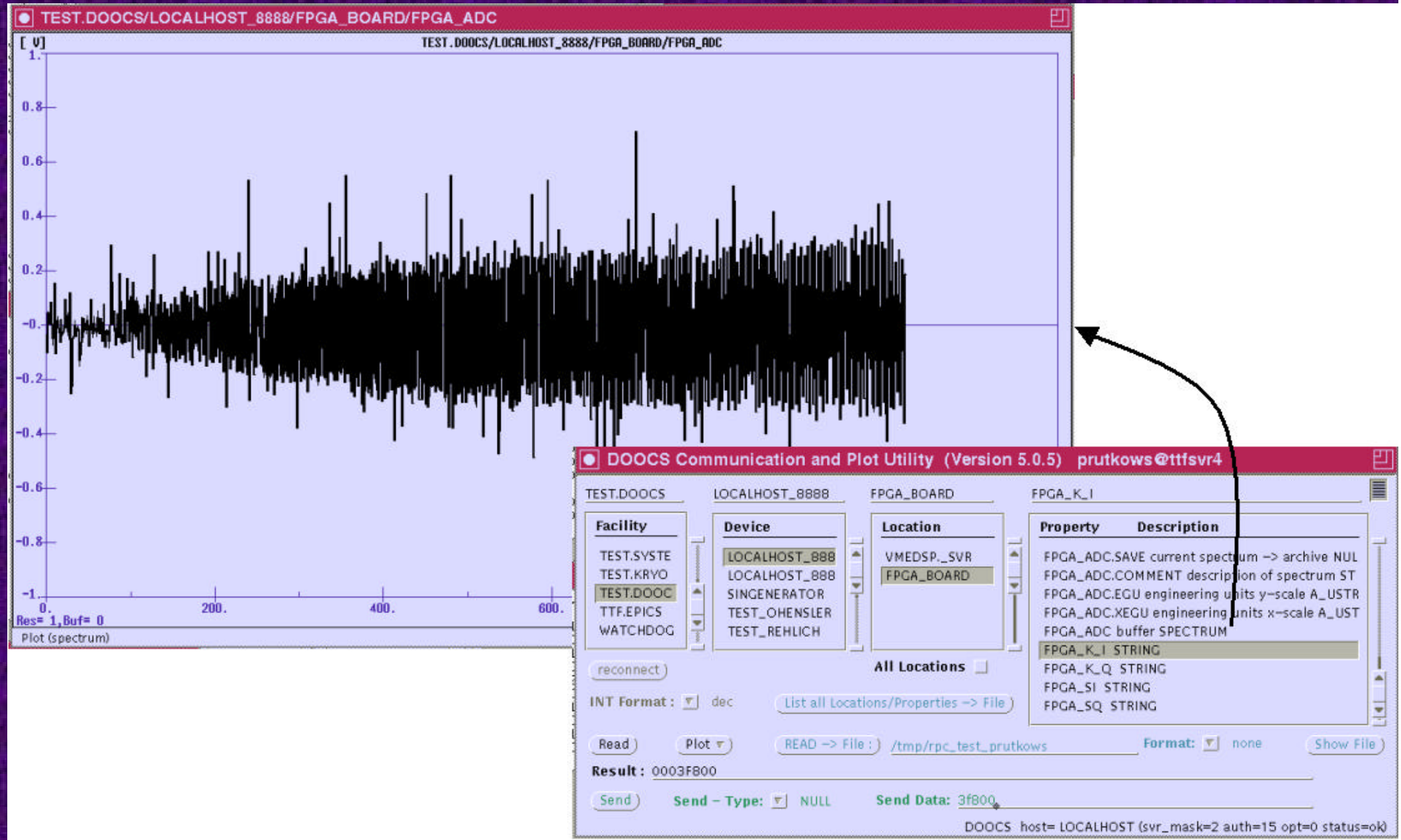
# Nallatech board



# Nallatech board

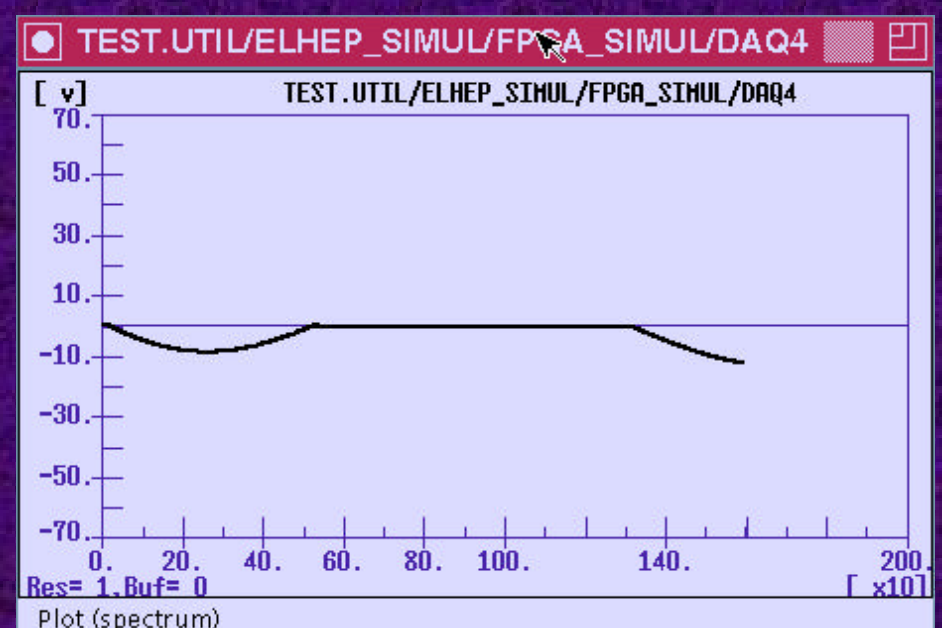
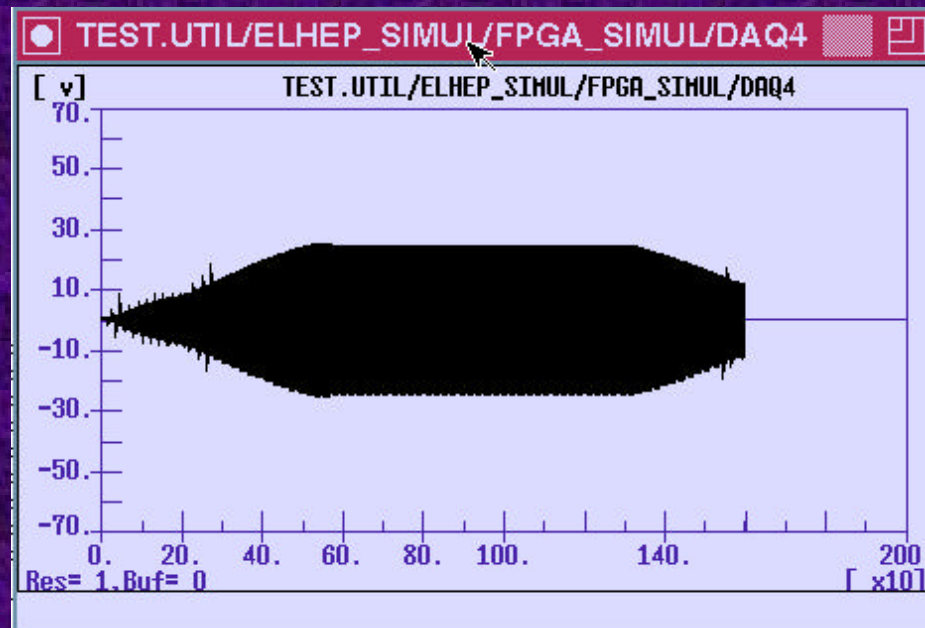
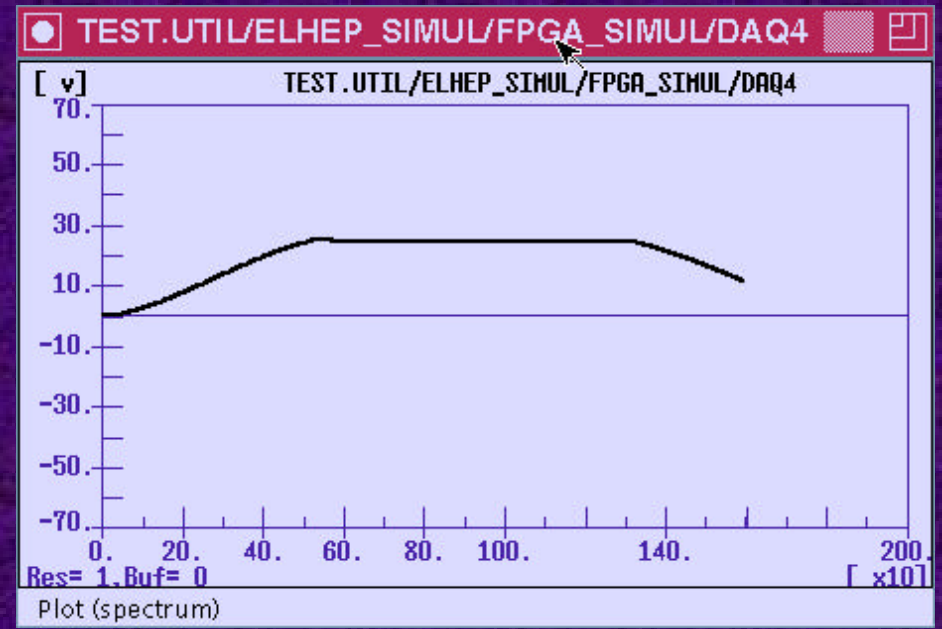
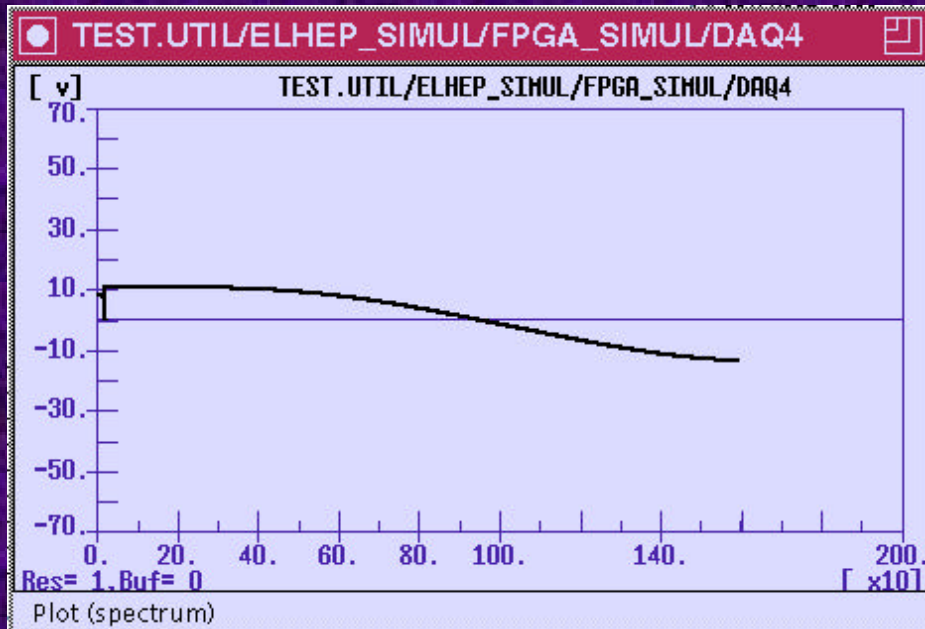


# Cavity controller, DOOCS





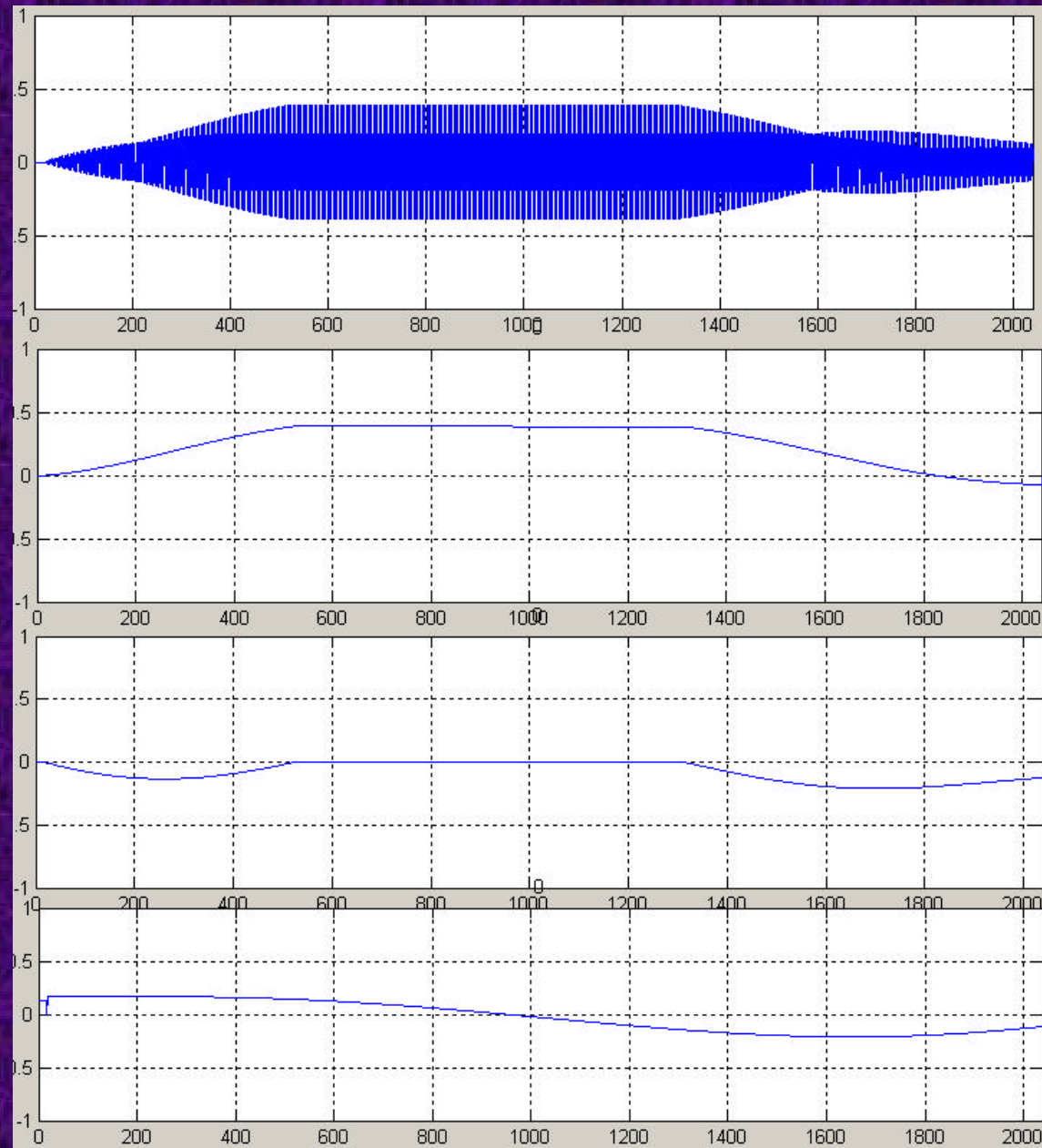
# Cavity controller, DOOCs



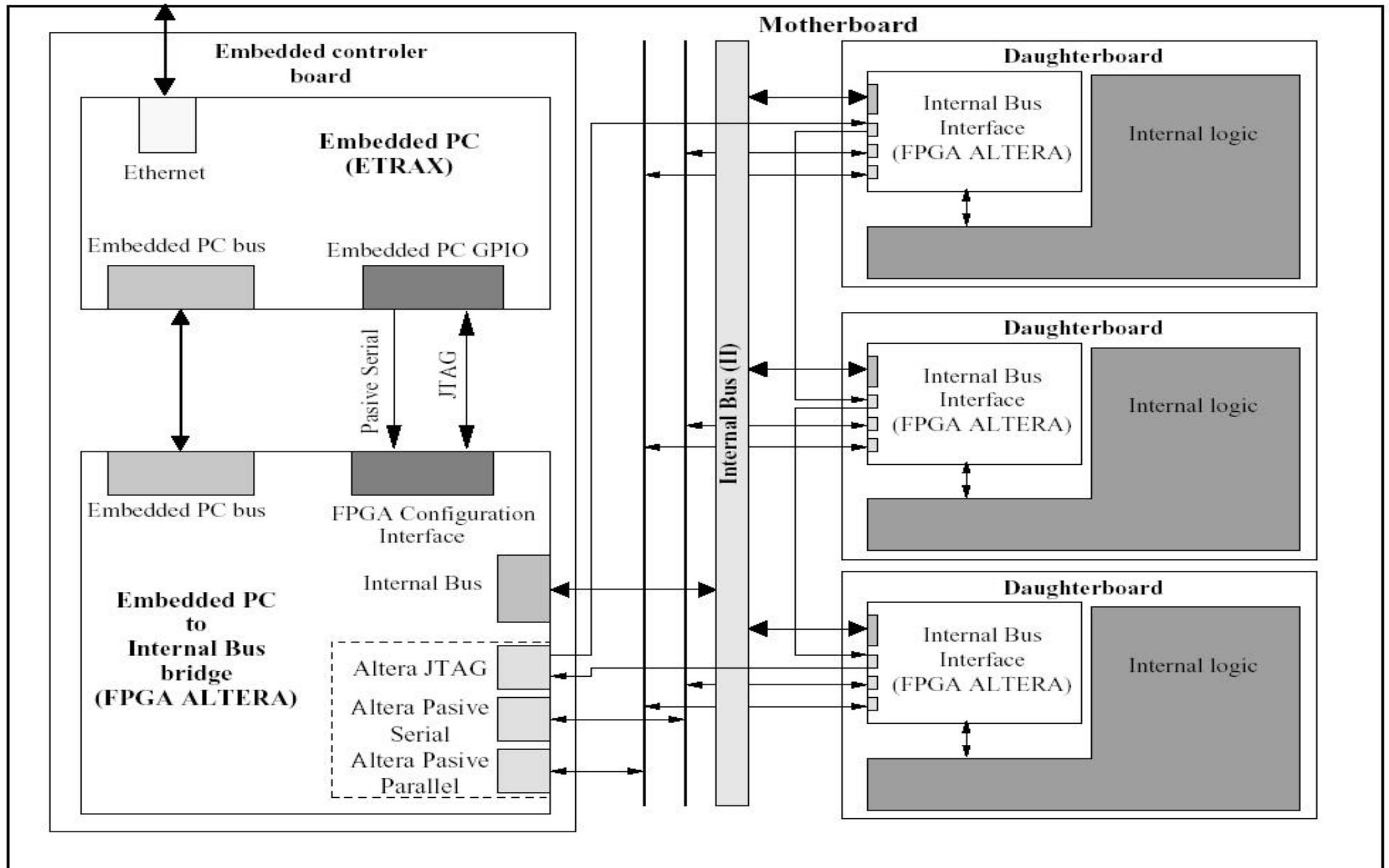
# Cavity simulator

- **Based on FPGA XILINX Virtex 2**
  - Implemented electrical and mechanical model of cavity
  - Step mode
  - Continuous mode
- **Access via Matlab**
- **Access via DOOCS**

# Cavity simulator



# New board



# Radiation tests

## Aluminum doped GaAs Light Emitting Diode (LED) as a cost effective and reliable Fast Neutron Detector for High Energy Particle Accelerator Applications

High energy neutrons produce „displacement damage“ in Light Emitting Diodes (LED) which results in the reduction of „light output“ of the LED (Figure 1).

On the other hand, high energy photons cause no such damage in the LEDs (Figure 2).

The above findings have been utilized to develop an inexpensive fast neutron detector for a myriad of applications in High Energy Particle Accelerator Monitoring.

# Radiation tests

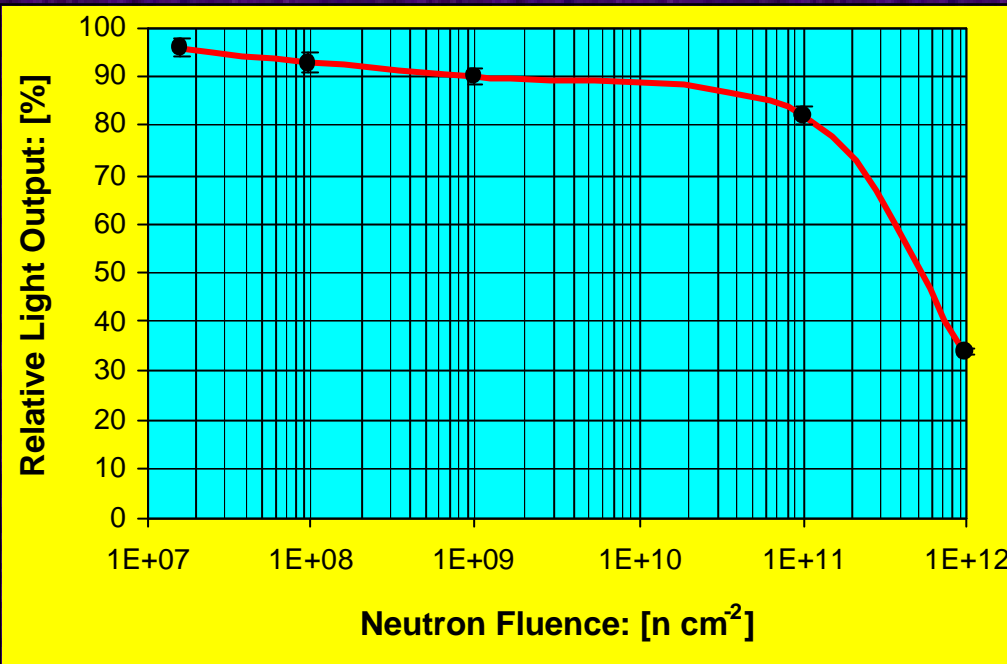


Figure 1:

Relative light output of the GaAs-LED shown as a function neutron fluence. The LEDs were irradiated with mono-energetic fast neutrons (ca. 60 MeV) at Harper Hospital Medical Cyclotron, Detroit, USA.

Figure 2:

Relative light output of the GaAs-LED shown as a function of gamma dose. The LEDs were irradiated with (<sup>60</sup>Co) gamma rays at Hahn Meitner Institute Berlin.

