EPICS Meeting 2005, Archamps

EPICS Device Support on Linux-x86 environment for fast beamline monitoring

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Introduction

- **ENZ Ingenieurbüro**
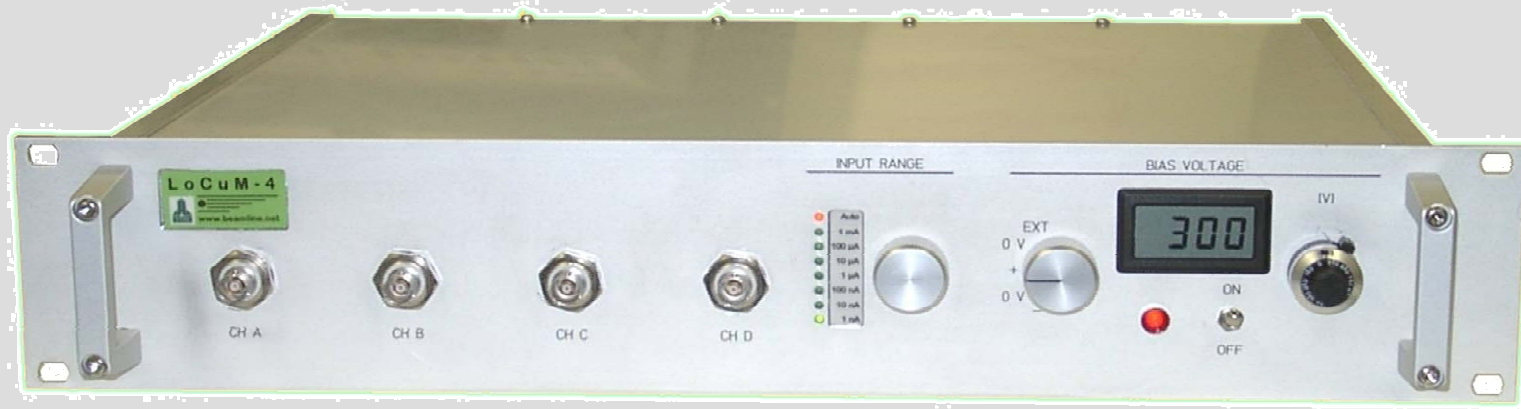
- **Berlin-Adlershof**

  'City of Science, Technology and Media'

- **Hardware, Software, Applications**

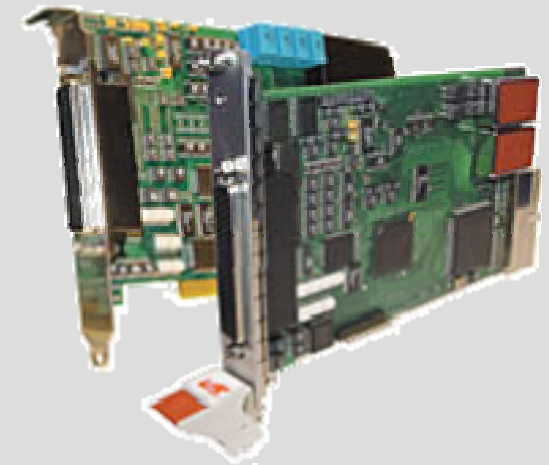**Cooperating with *BESSY, FMB***

Motivation

- **LoCuM4**
  - **Cooperation with FMB, BESSY and Delta**
  - **4 Ch low current meter for beam position monitoring**
- **EPICS support desired**
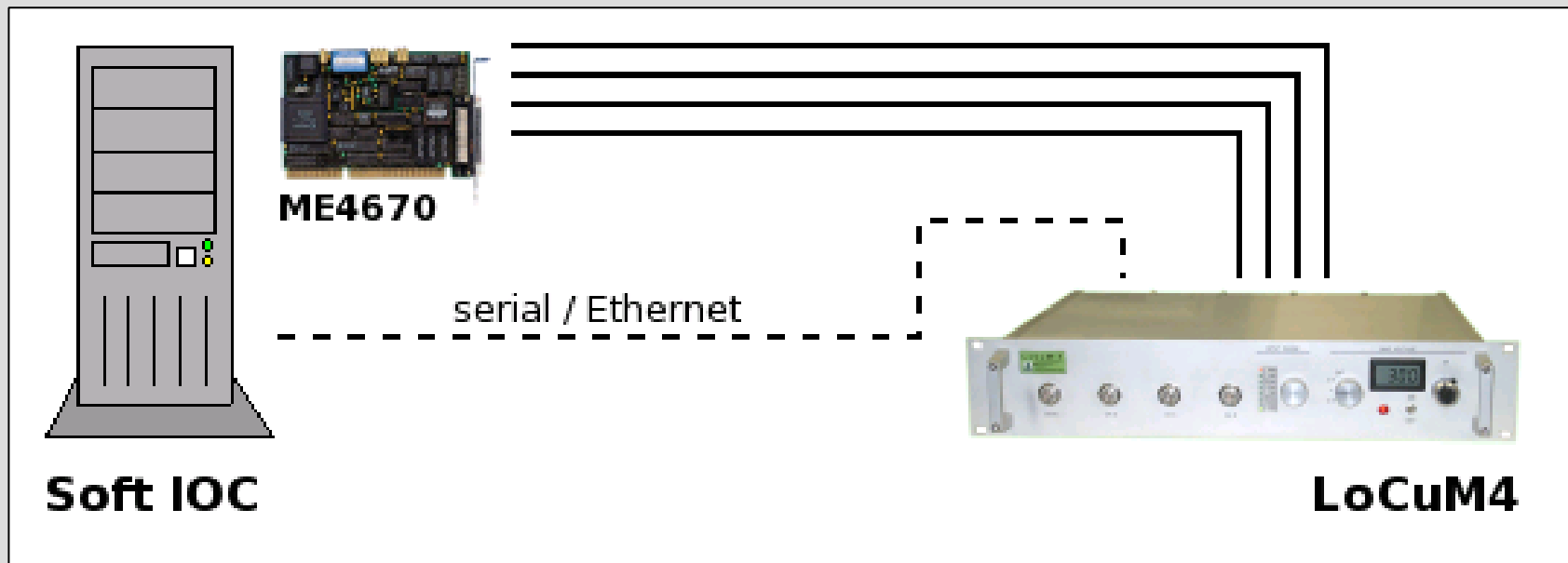
Environment

- **EPICS on x86 Linux SoftIOC**
  - fair priced hardware
  - cost-efficient development

- **RedHat Linux 9.0**
  - Kernel 2.4.x = 'rock solid'
  - Optional: *Concurrent RedHawk* Linux (Realtime)

- **Fast AD PCI card**
  - Meilhaus ME4670 PCI

Meilhaus ME4670

- **Analog -> Digital**
  - **500kHz/16Bit A/D conversion**
  - **32 channel single ended / 16 channels differential**
- **Additional Features**
  - **4 channel 500kHz/16Bit D/A conversion**
  - **32 digital I/O lines**
  - **16 Bit counter**
- **Linux Driver**
  - **Source code under GPL**
  - **Compiled as loadable Kernel module**

The Setup

ME4670

serial / Ethernet

Soft IOC

LoCuM4

- **Serial / Ethernet connection for control link**

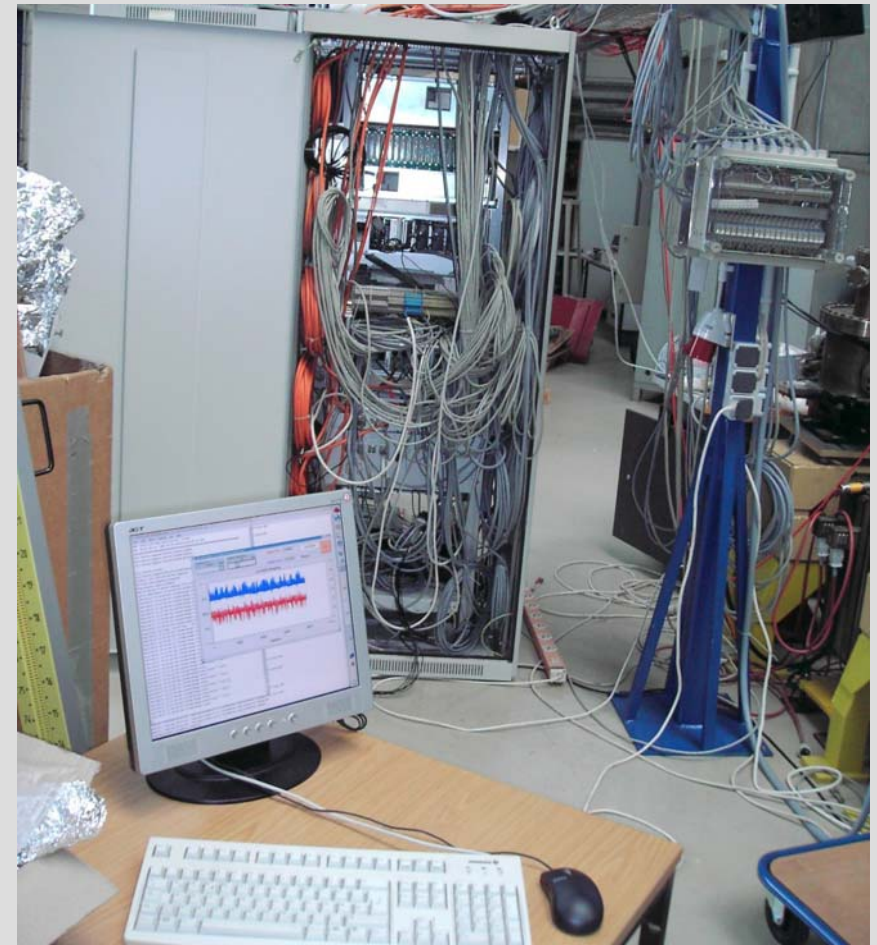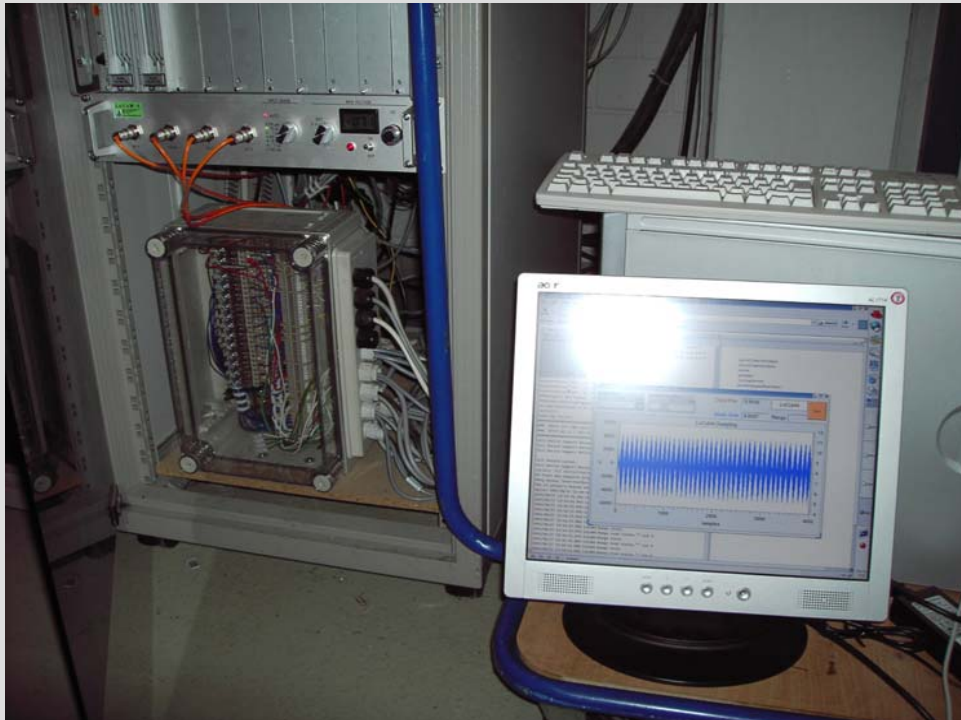- **4 channel single ended measurement**

Implementation

- **Control link to LoCuM4**

  – **serial / socket, message based, asynchronous**

  – **AsynDriver**

- **Beam position data**

  – **4 channel bipolar 10V**

  – **Asynchronous device support (Continous Sampling)**

  – **Synchronous device support (Single measurements)**

PV's / Record Types

- **Scalar / Primitive Values**

  – **Range, Status, ... (Stringin)**

  – **Voltage per Channel (Ai), Position/Asymmetry (Calc)**

- **Array Values**

  – **Voltage per Channel (Waveform)**

  – **Calculated Position/Asymmetry (Waveform)**

- **Visualisation**

  – **Extensible Display Manager (EDM)**
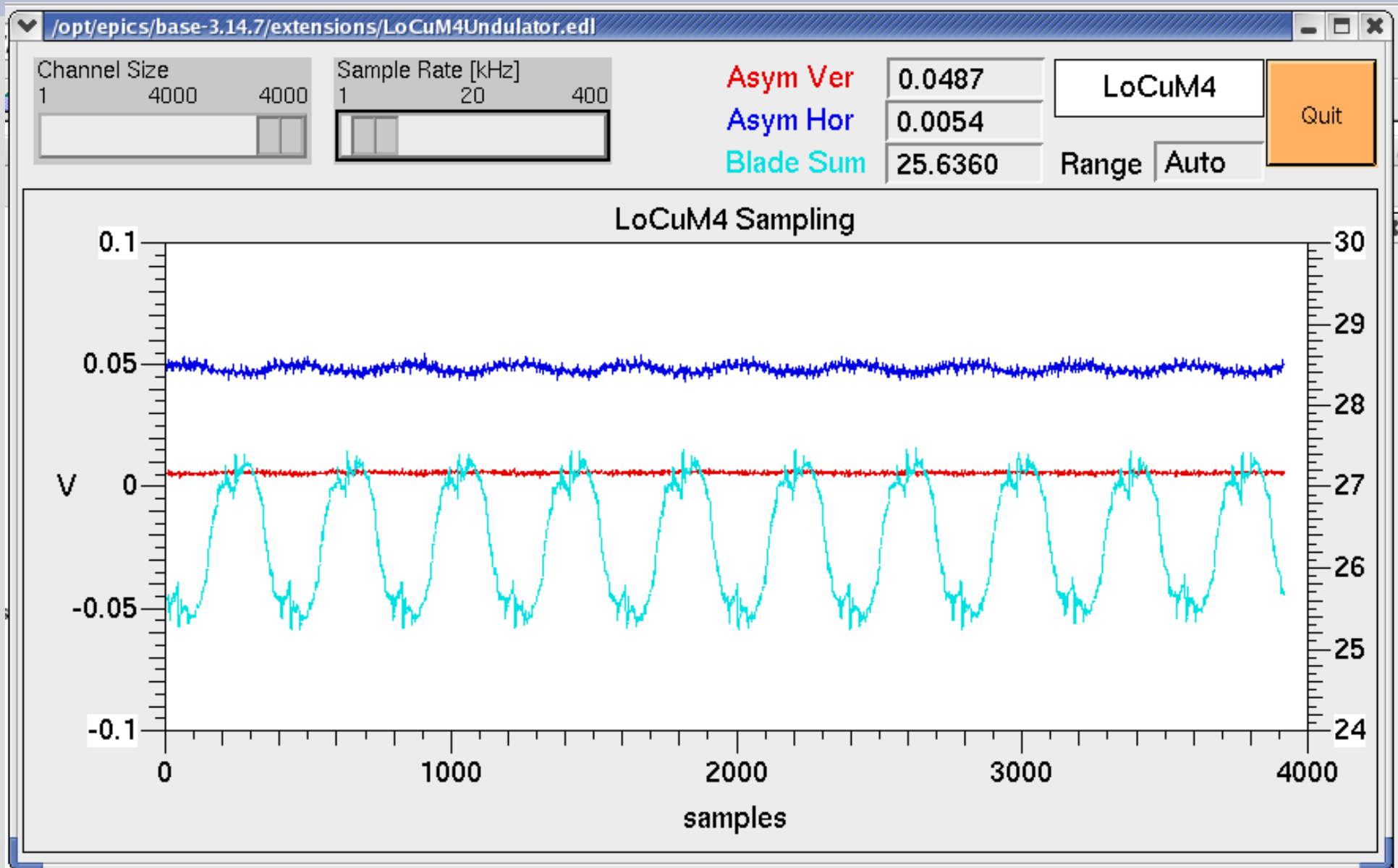
Tests

- **September 26th/27th at *Delta,* Dortmund**

Tests

- **EPICS 3.14.7 SoftIOC in 3.13 environment**

    – **seamless integration**

    – **Process Variables in both directions accessible**

- **Measurements**

    – **Undulator, Wiggler, Dipol BPM's**

    – **Single Values**

    – **Array Data, Sampling from <1kHz up to 125kHz**

Tests

Conclusion/Discussion

- **EPICS on Linux platform is gaining ground**

  – **Does it always has to be Realtime?**

- **Calculation with Arrays**

  – **Difficult with 3.14.7!**

- **AsynDriver**

  – **Back door to communication based on delimiters?**

Perspective

- **EPICS support for LoCuM4 nearly accomplished**

  – **Available soon**

- **Dedicated IOC for beam position monitoring**

  – **PC based SoftIOC able to connected 8 BPM's, up to 60kHz Sampling**

  – **Moving to smaller/embedded hardware planned**

  – **Feedback control…**

- **Dedicated IOC as Analysing Tool**

Thanks for your attention...

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