LED notched fibre distributing system

QMB1 single LED slice

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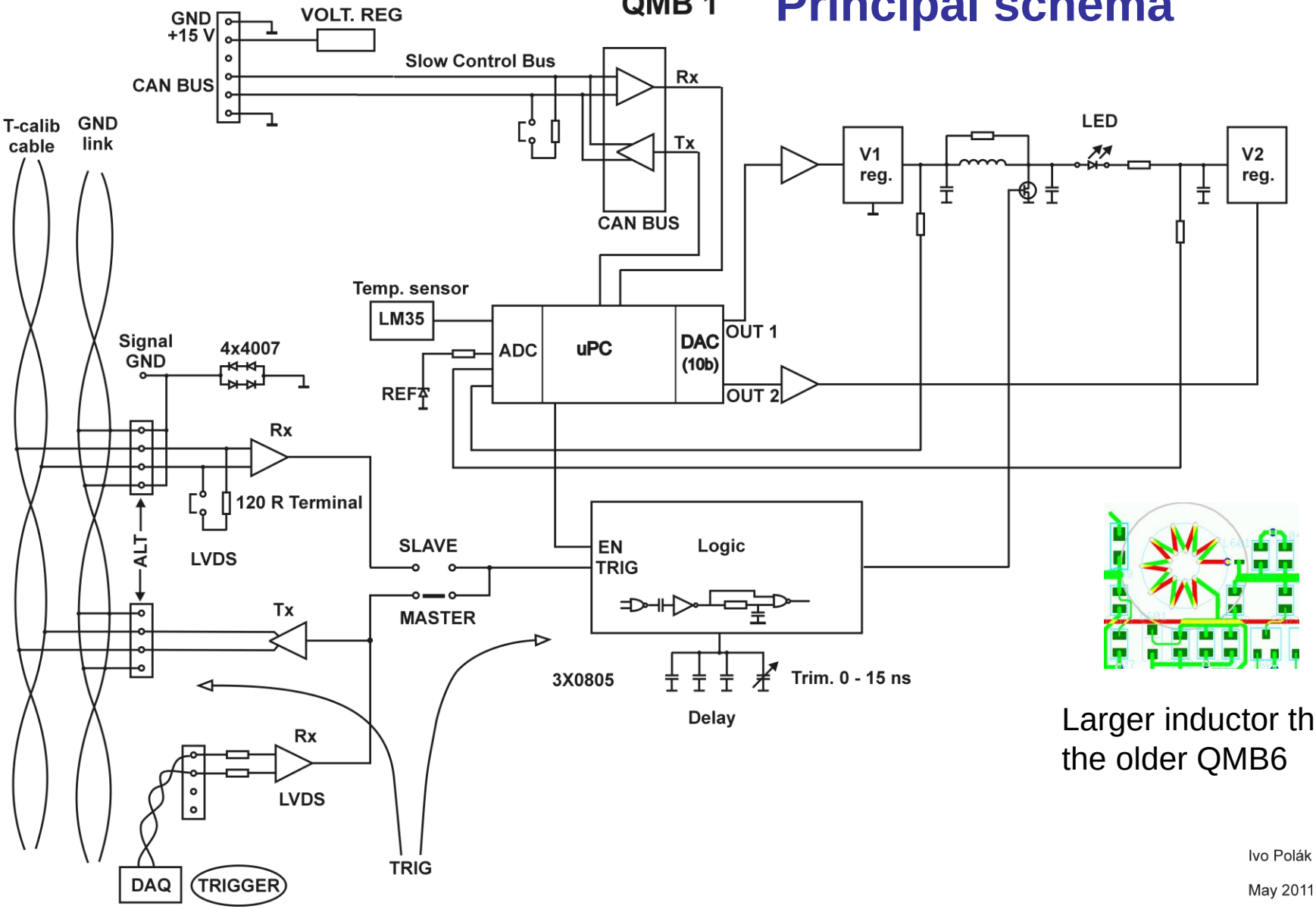
1. QMB1 specifications
2. QMB1 with Toroidal inductor at PCB
3. Trigger distribution
4. Notched fibre light distribution systems 3x24
5. Resume

QMB1

- Quasi resonant Main Board
  - Modular system, 1 LED per board
  - Operation mode:
    - DAQ + CANbus control
    - stand-alone mode
  - LVDS Trigger distribution system
  - Variable amplitude, zero to maximum (~1Amp) smooth
  - Pulse width fixed to ~ 5ns (UV or blue LED)
  - Voltages and temperature monitoring
  - Size of PCB: width 30mm, depth 140mm

QMB 1 Principal schema



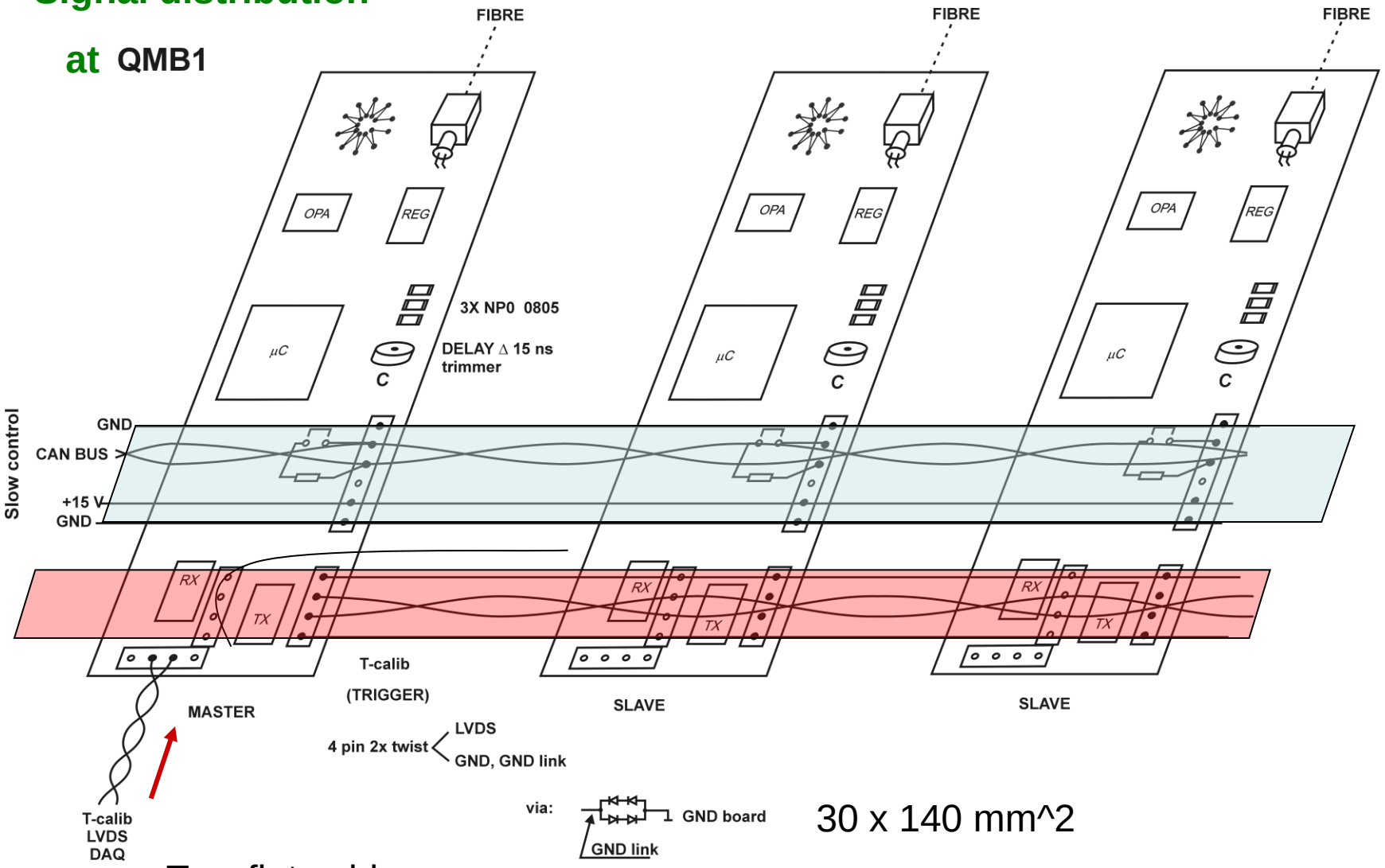
Larger inductor than the older QMB6

Ivo Polák

May 2011

Signal distribution

at QMB1



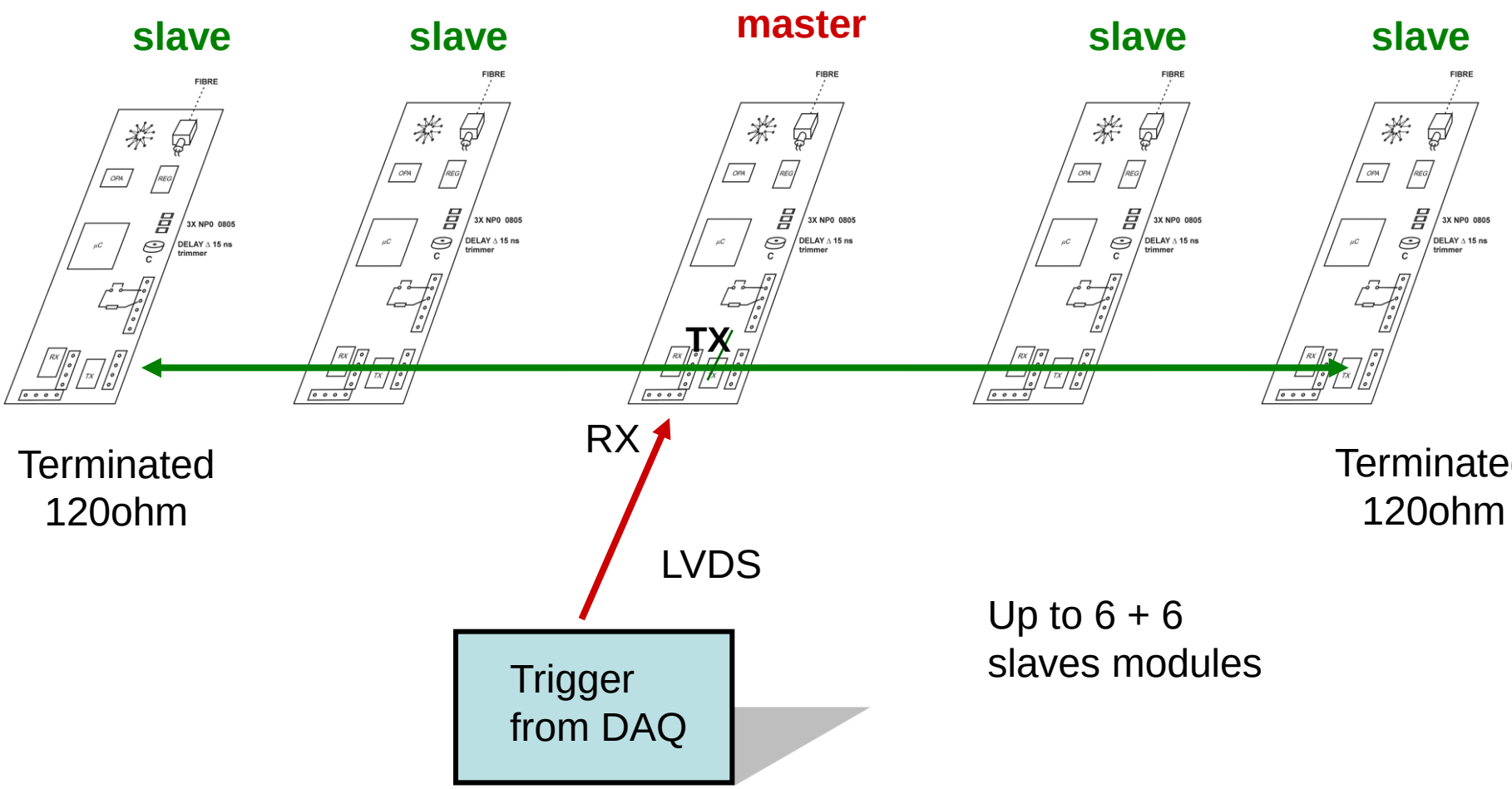
30 x 140 mm^2

Two flat cables,
Twisted pair for Trigger

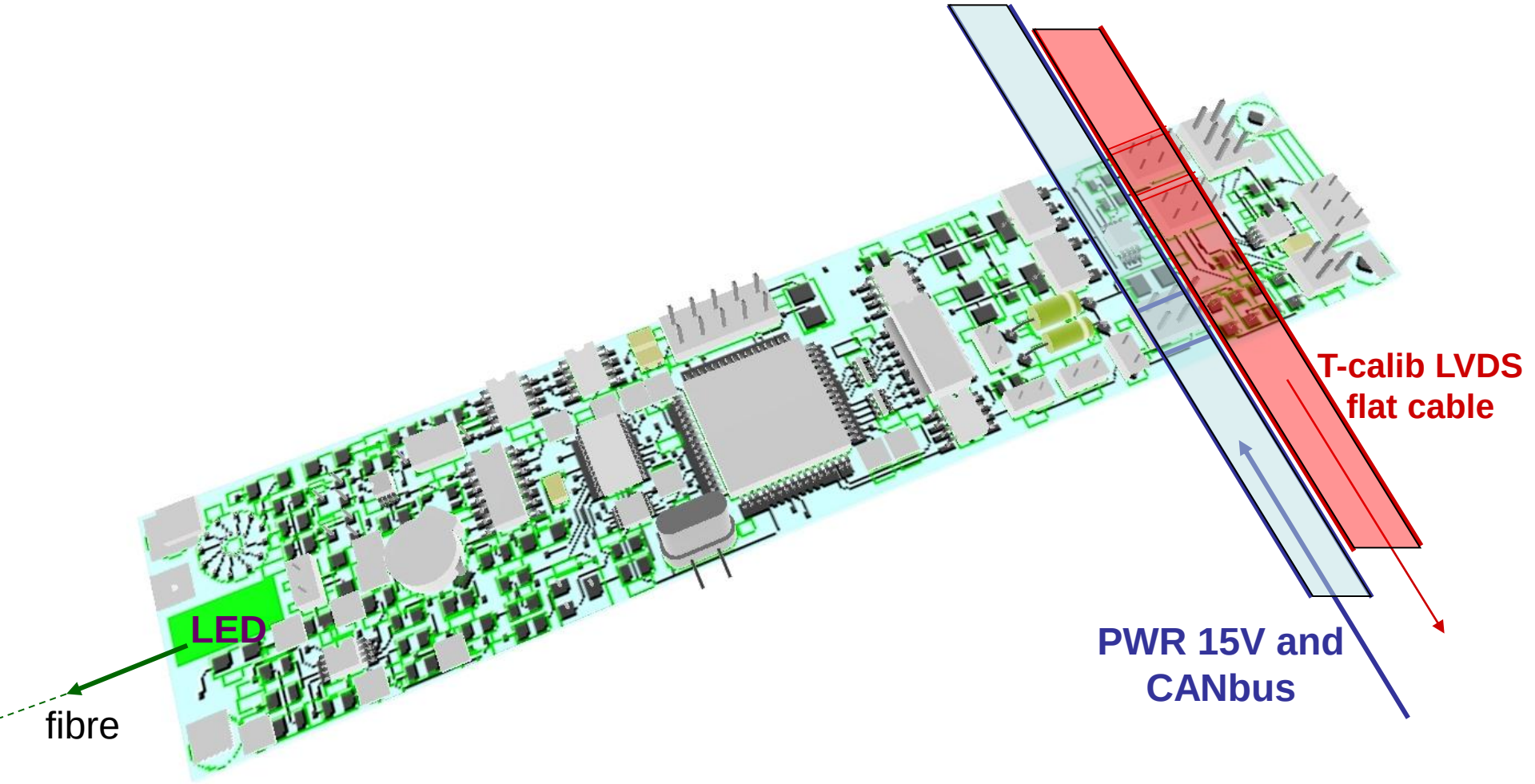
Ivo Polák

May 2011

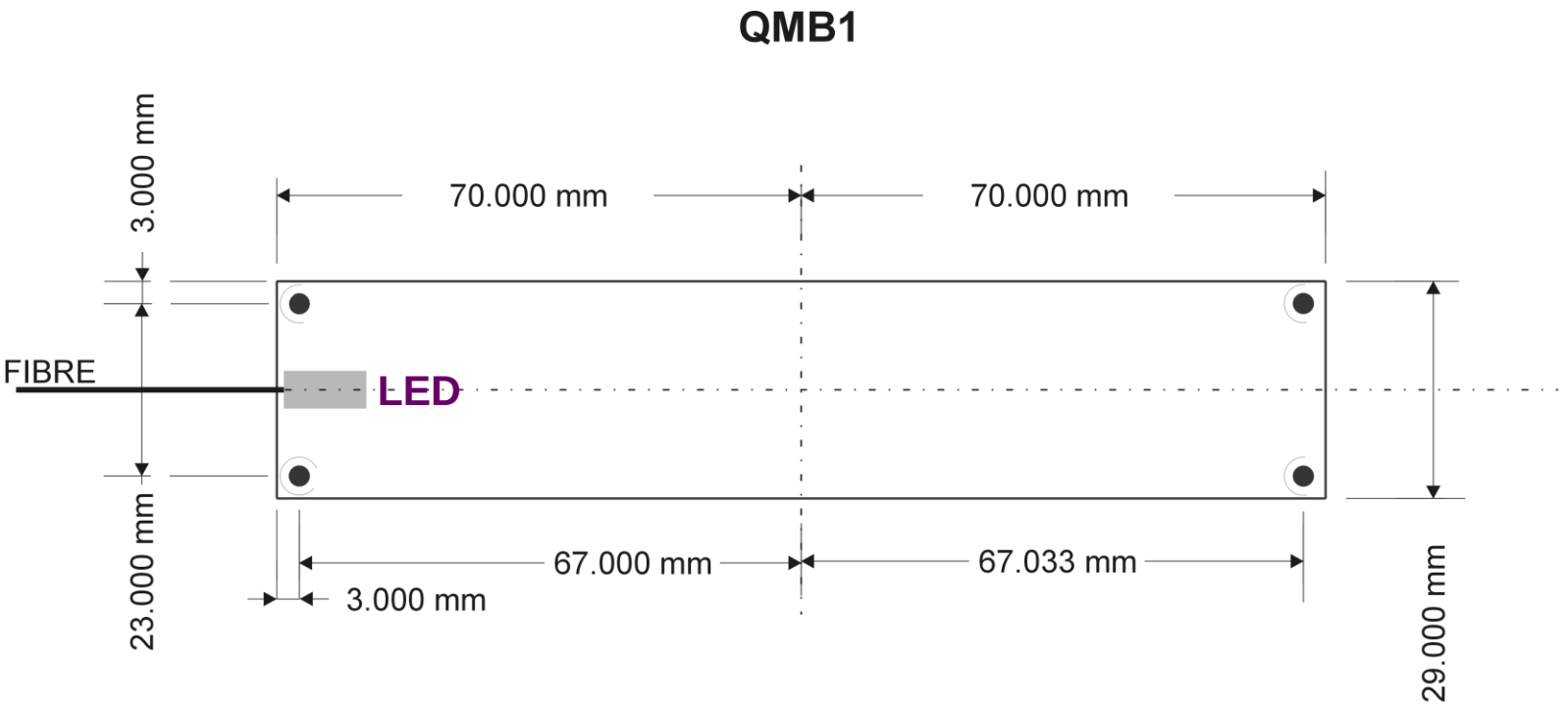
TRIGGER (T-calib) LVDS distribution to QMB1



3D draw of QMB1



Mechanical layout of QMB1

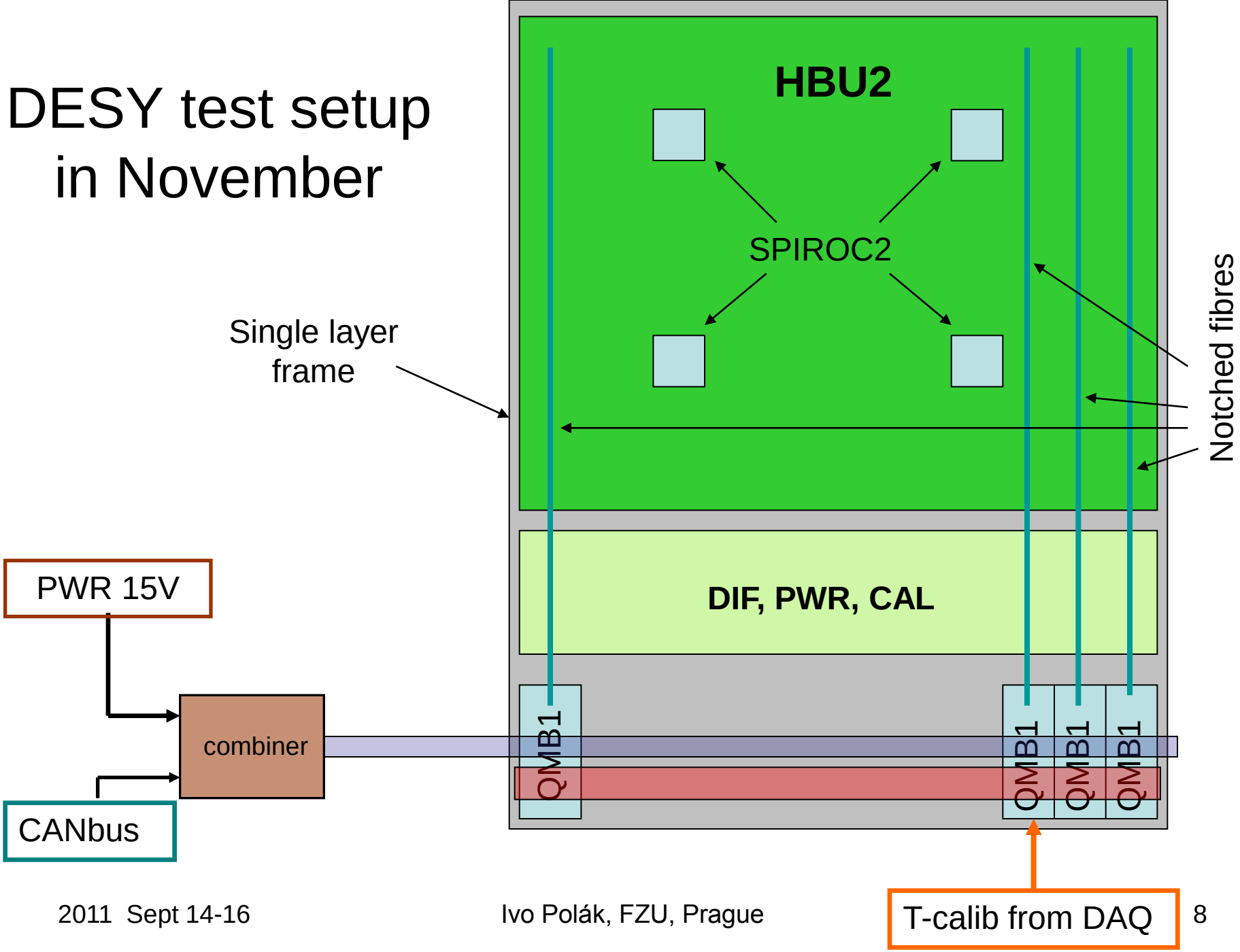


Outer line: 30 (29) x 140 mm*2

4 mounting holes for M2.5 screw

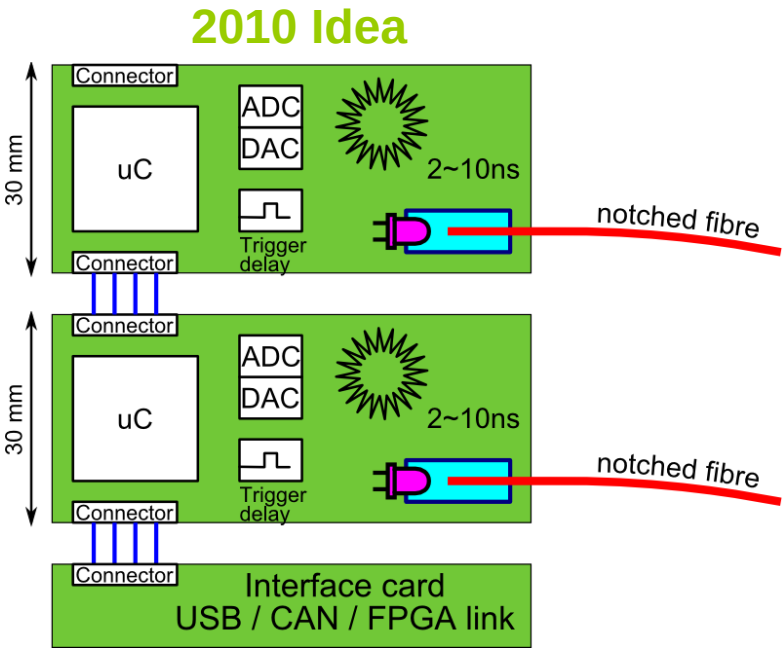
FZU AS CR
M. Janata
Sept. 2011

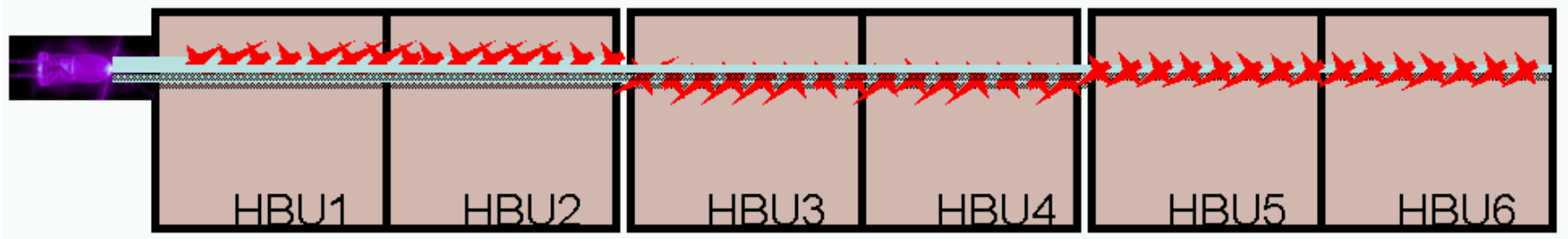
DESY test setup in November



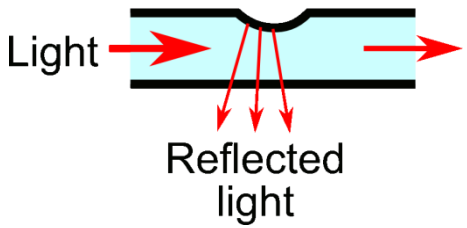
work at 2011

- **QMB1 (1-chanel LED driver)**:
  - Done
    - Topology, PCB design
    - Communicating bus (CAN)
    - CPU (Atmel AVR)
    - Trigger distribution (LVDS)
    - Trigger delay canbe tuned by C trimmer (~10ns)
    - 4 mounting holes for screw M2.5
    - Fibre(LED) position set to center of PCB
  - PCB in production + assembly
  - To be done Debugging in October/beginning of Nov
- Set of **notched fibers, semiautomat machine under development**
  - Set: 3*fibre with 24 notches, creating a line of 72 notches.
  - 3 sets will be delivered in November





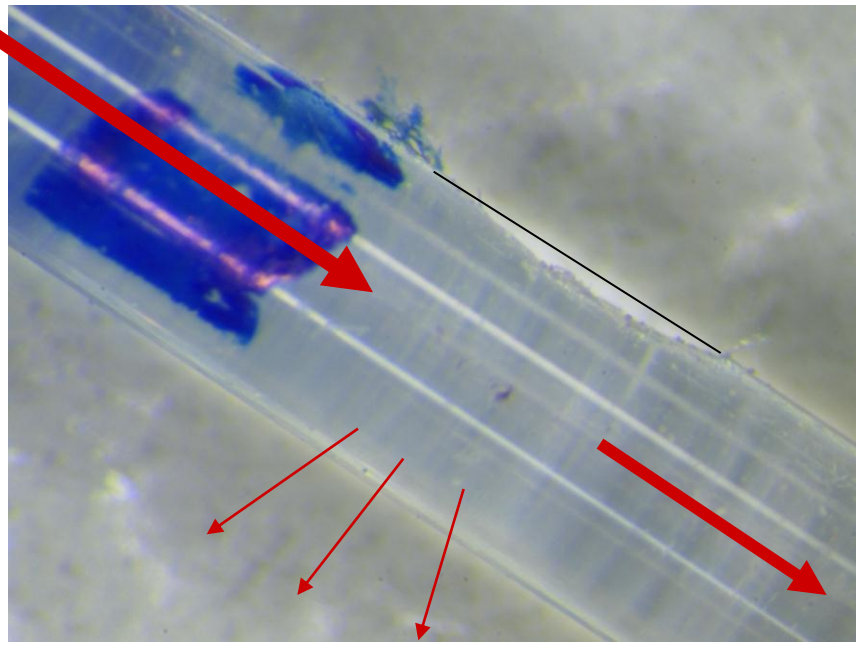
Notches at one long fibre (24notches total)

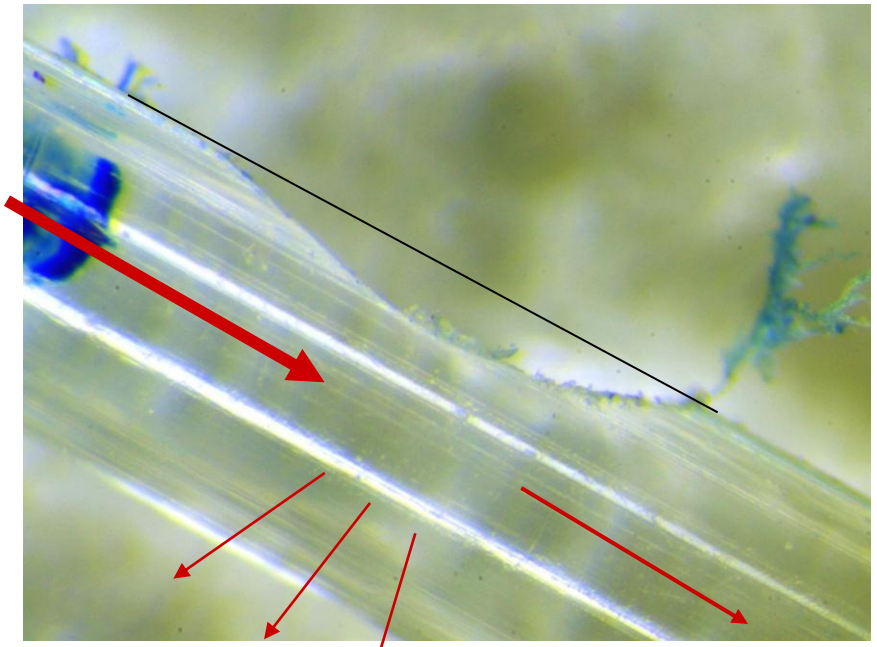


LED side

Notch # 4

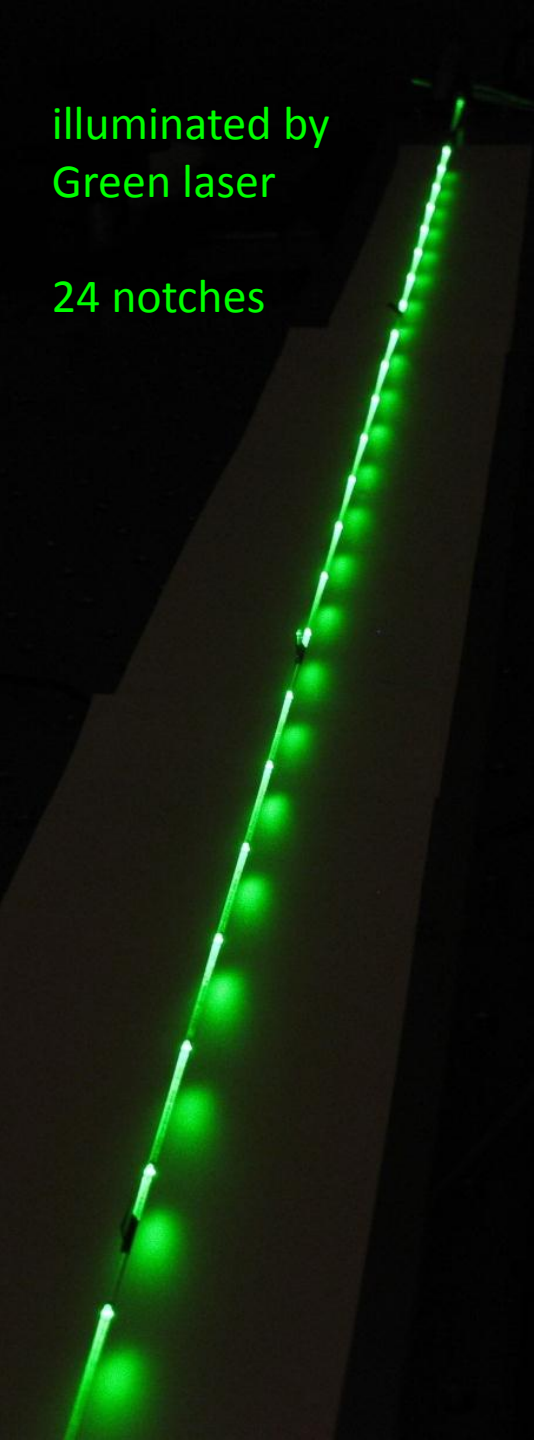
Notch # 24 last one, biggest





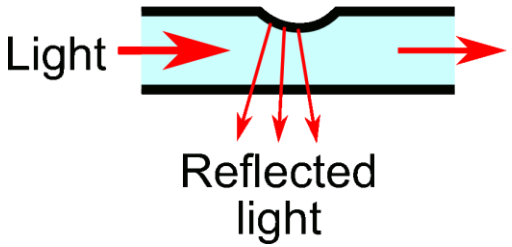
Light coupled
from tap

Taken on microscope with zoom ~50



Notched fibres

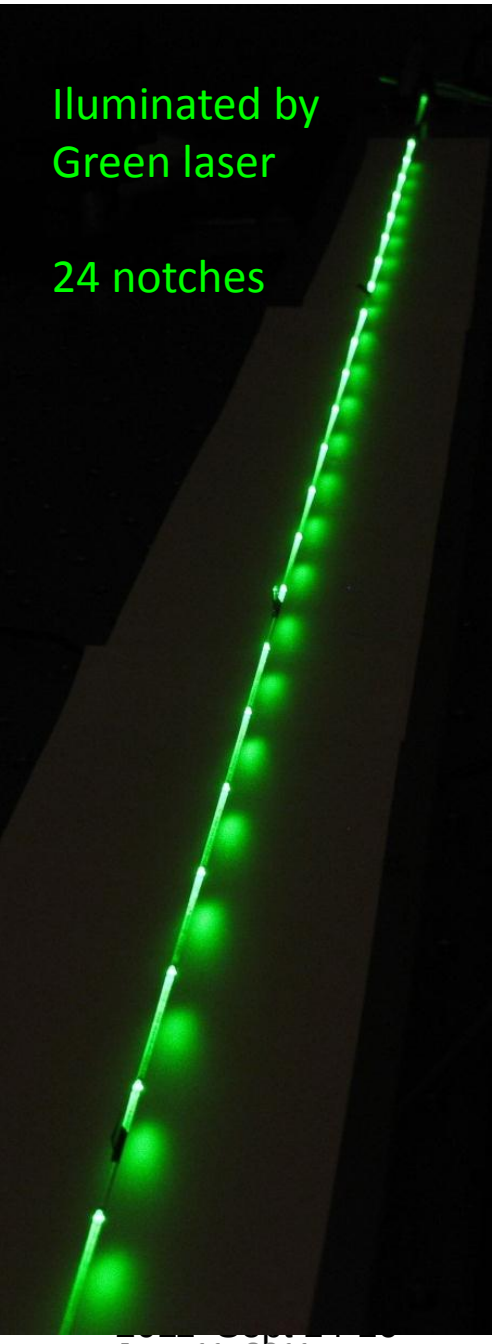
- external company Safibra preparing the setup (semiautomat) to produce precise notches in the fibres
- We will have prototype fibres made by new technology in November, we assume less spread of the light at taps (<15%).
- as backup, we have old 3 + 1 fibres (12 notches, spread <10%) in hand for November test with HBU at DESY



Resume

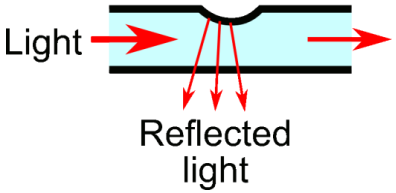
- QMB1 is in production stage
  - First 4 samples promised in October
  - Coupling to fibre to be defined
- QMB1 in hand with fw - expected in autumn

- 3 sets of Notched fibres scheduled to be delivered in November
- semiautomatic machine is under development

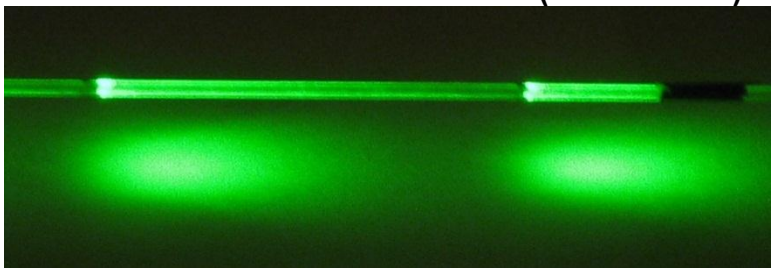


Distribution of light: Notched Fiber

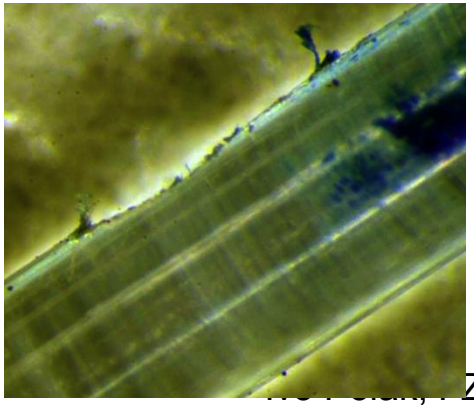
- Light is emitted from the **notches**
- The **notch** is a special scratch to the fiber, which reflects the light to the opposite direction
- The size of the notch varies from the beginning to the end of the fiber to maintain homogeneity of the light, which comes from notches



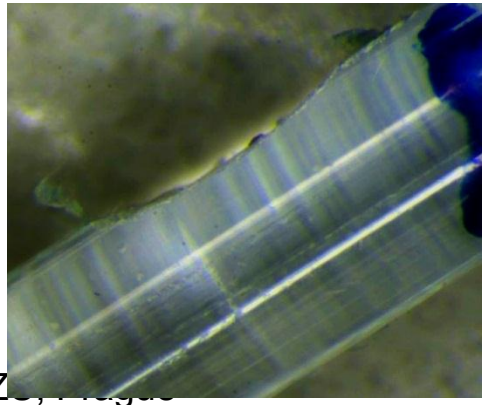
Emission from the fiber (side view)



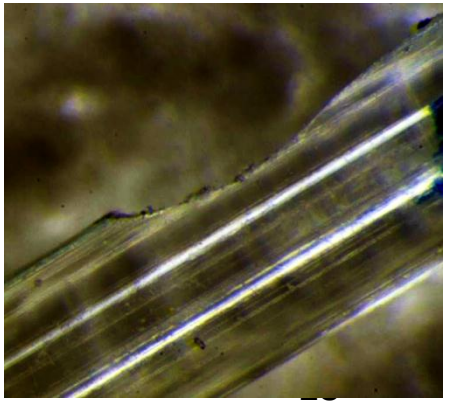
First notch



Middle notch



End position notch



Notched fibre illuminated by green laser pointer