MX-10

PIXEL PARTICLE DETECTOR

See a different world

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Introduction

JABLOTRON MX-10:
- Portable educational kit for high schools and universities
- Developed at JABLOTRON ALARMS a.s. under the Medipix/IEAP CTU in Prague/ARDENT collaboration
- MX-10 comprises a Timepix chip from the Medipix2 Collaboration (CERN technology transfer), read-out interface developed at Jablotron in cooperation with IEAP CTU in Prague, Pixelman software developed at IEAP CTU in Prague
- Experiment Guide for busy teachers
- Offered in two kits – basic or complete Edukit with a positioner, source and other demonstration components

Features

- Unique educational aid for demonstrations and research
- Exploration of ionizing radiation
- State-of-the-art technology from the world's best scientists
- Real-time display – digital video camera
- Recognizes different types of particles – α, β, γ, MIP (e. g. Muons)
- Differentiates particles on screen with a characteristic trace
- Wide energetic spectrum
- New experiments for physics education and research
- Simple and intuitive software control

Chip description

Timepix detectors:
- Developed in the Medipix2 Collaboration at CERN
- High energy physics for other fields

Top layer:
- Hybrid semiconductor pixelated detector
- 256 x 256 pixels
- Pixel size: 55 x 55 μm^2
- Silicon sensor layer thickness 300 μm
- Active area 14 x 14 mm

Pixelated 300 μm thick Si sensor chip (256 x 256 pixels, 55 μm pitch)

Read-out ASIC Timepix chip

14 mm

detector bias voltage (~ 100 V)

Bottom layer:
- Each pixel connected to an amplifier, comparator and counter
- Connection – Bump bonding technology

Operation:
- Ionizing particle entering a pixel creates a charge
- Charge converts to an electric current
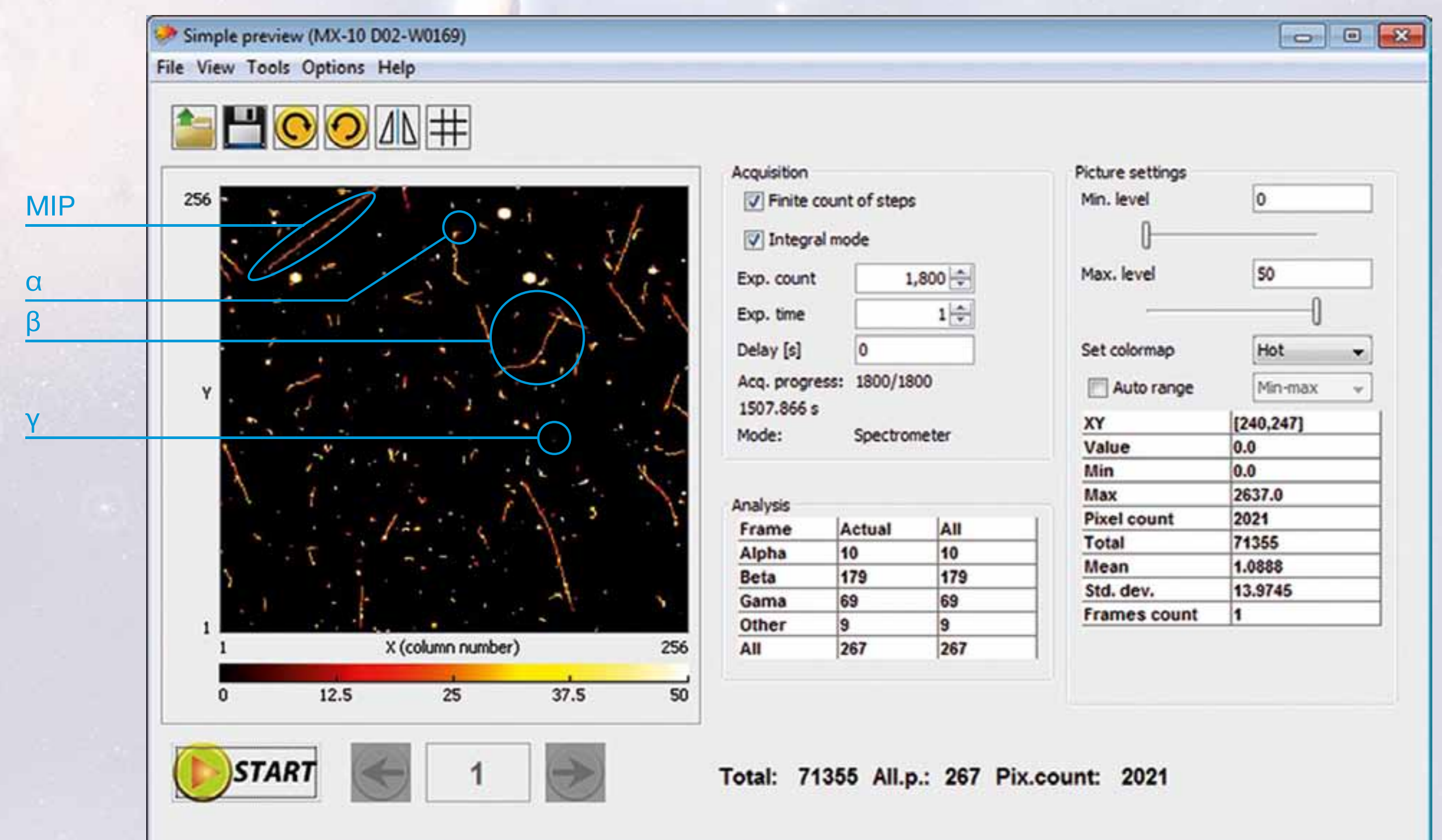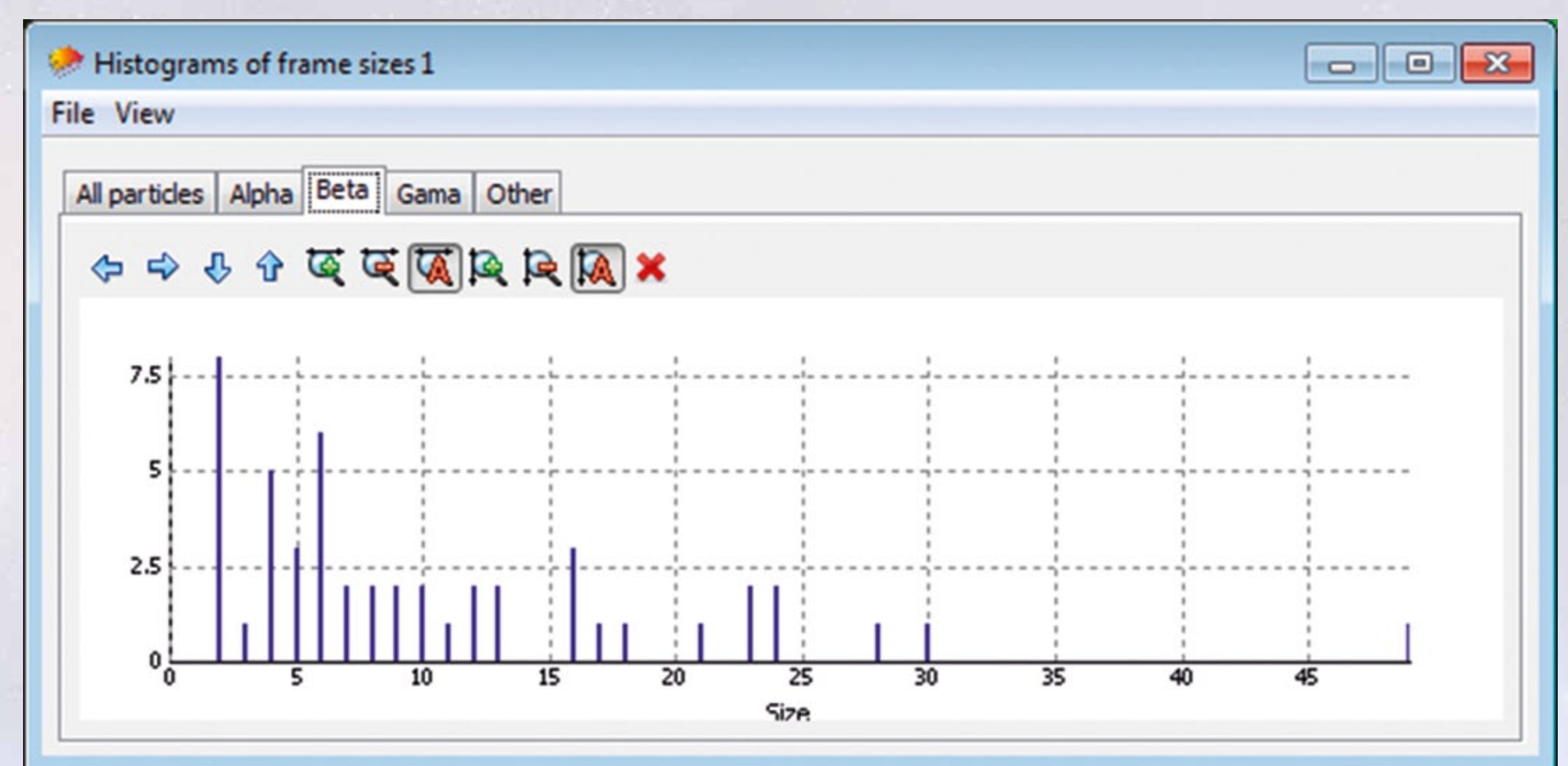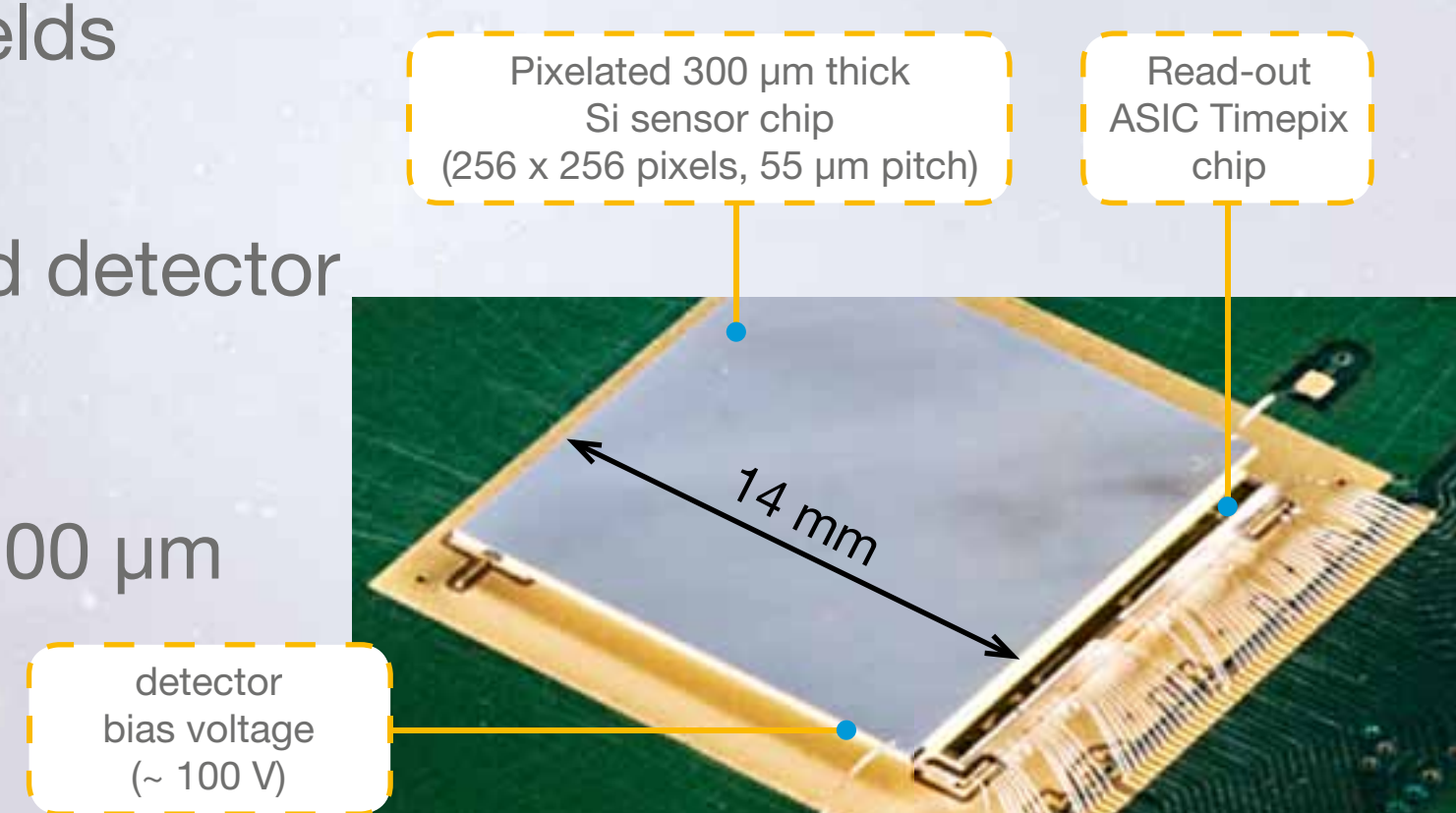- Amplified and registered by a digital counter

Design

- Portability, manufacturability and reliability
- FPGA – 150 FPS
- USB 2.0 hi-speed interface
- Status indication (Green – Ready and Red – Busy)
- Sliding cover – protects the sensor chip, experiments with alpha particles possible
- Mount to fit standard camera tripod or M6 bolt
- Weight 160 g
- Tested and certified to EN61000-6-1 and EN 61000-6-3 standards

Seeing is believing...

Basic Pixelman interface (image of natural background, 30 min.)

References

- www.jablotron.com/mx-10
- www.utef.cvut.cz/en/
- medipix.web.cern.ch/medipix/

Acknowledgement

JABLOTRON
CREATING ALARMS