

**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



# 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

MIP

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.)

# Simple preview (MX-10 D02-W0169) File View Tools Options Help Image: Constrained by the settings Image: Constrained by

- State-of-the-art technology from the world's best scientists
- Real-time display digital video camera
- Recognizes different types of particles  $\alpha$ ,  $\beta$ ,  $\gamma$ , 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**

detector bias voltage

(~ 100 V

#### **Timepix detectors:**

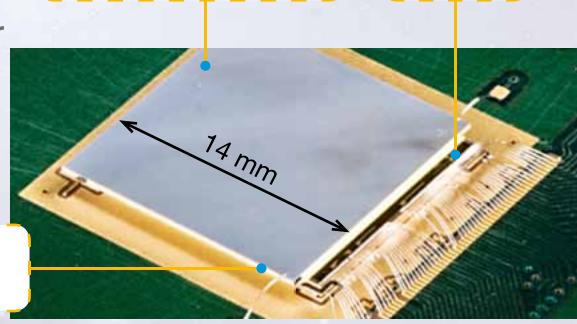
- Developed in the Medipix2 Collaboration at CERN
- High energy physics for other fields

#### **Top layer:**

- Hybrid semiconductor pixelated detector
- 256 x 256 pixels
- Pixel size: 55 x 55 µm<sup>2</sup>
- Silicon sensor layer thickness 300 µm
- Active area 14 x 14 mm

#### **Bottom layer:**

- Each pixel connected to an amplifier, comparator and counter
- Connection Bump bonding technology



Pixelated 300 um thick

(256 x 256 pixels, 55 µm pitch)

Read-out

**ASIC** Timepix

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#### References

#### **Operation:**

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

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

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