

# PITEC

## Communication and Imaging Systems

### PIMEGA DETECTORS AND APPLICATIONS

The logo for PITEC, featuring the Greek letter pi (π) followed by the letters 'tec' in a stylized, lowercase font.

# PI TEC: ADVANCED DETECTOR SOLUTIONS

## PI TEC at a glance

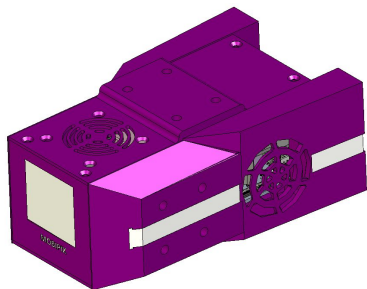
- PITEC is located in Campinas - São Paulo / Brazil
- Designs and develops advanced hardware for communication and imaging applications
- Strong background in Microelectronics, Photonics Packaging and Product Engineering
- PITEC develops and builds high-performance X-ray detectors for materials science applications (PIMEGA DETECTOR FAMILY)



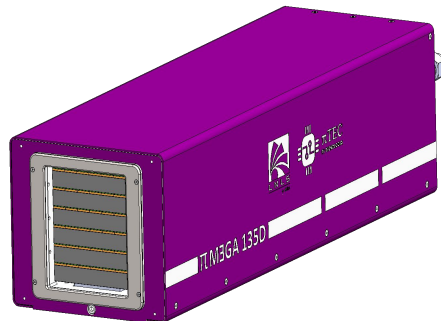


# PIMEGA DETECTOR MODELS

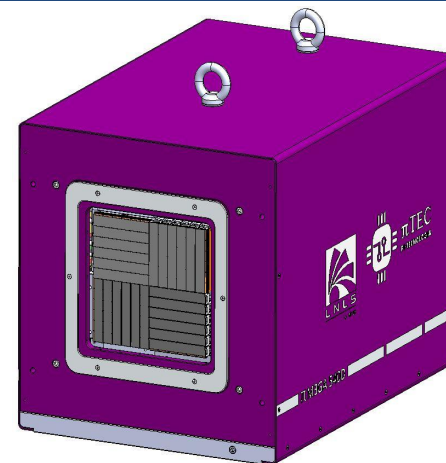
PIMEGA 15D (MOBIPIX)



PIMEGA 135D



PIMEGA 540D



PIMEGA 450D



Size: 28 x 28 mm<sup>2</sup> (262 kP)

High speed - 2000 fps

Being Commissioned

Size: 85 x 85 mm<sup>2</sup> (2.4 MP)

High speed - 2000 fps

Commissioned

Size: 170 x 170 mm<sup>2</sup> (9.4 MP)

High speed - 2000 fps

Commissioned

Size: 14 x 1710 mm<sup>2</sup> (7.9 MP)

High speed - 2000 fps

Under development

- ASIC: Medipix3RX (55 x 55 μm)
- High spatial resolution
- Si sensors thickness of 300μm or 675μm
- Detector geometry: Overlapped or Coplanar

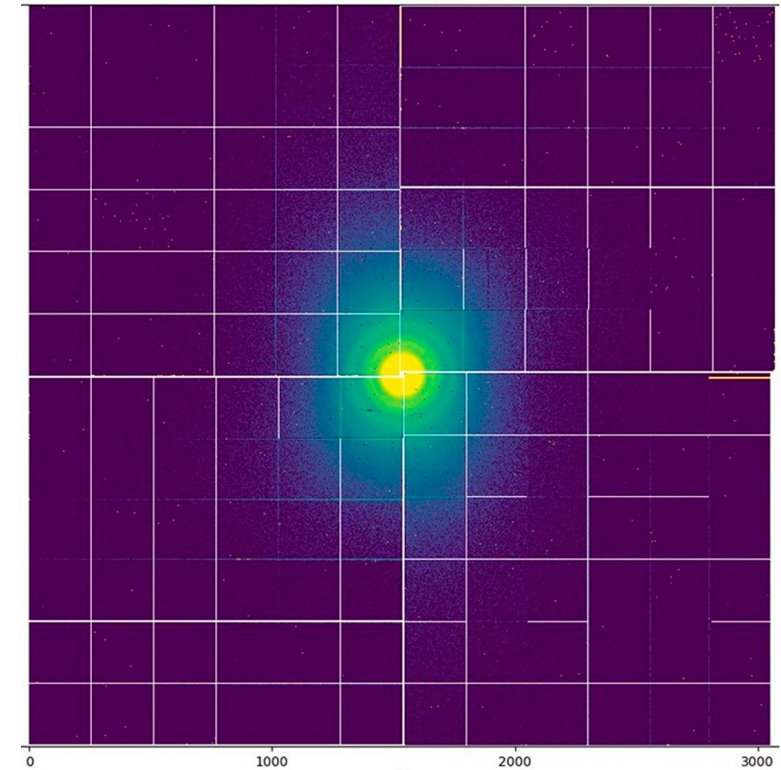
# PIMEGA DETECTOR HARDWARE

## Key Features

- High modularity, allowing a high degree of customization in terms of the detector sensitive area
- Short readout time (500 $\mu$ s)
- Low dead area
- Water cooled
- Vacuum compatible (10<sup>-3</sup>mbar)



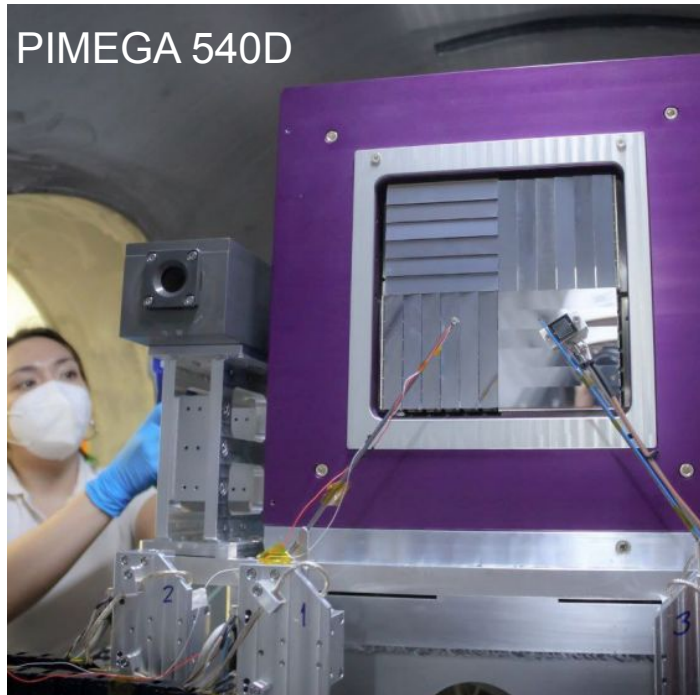
# PIMEGA DETECTOR SOFTWARE



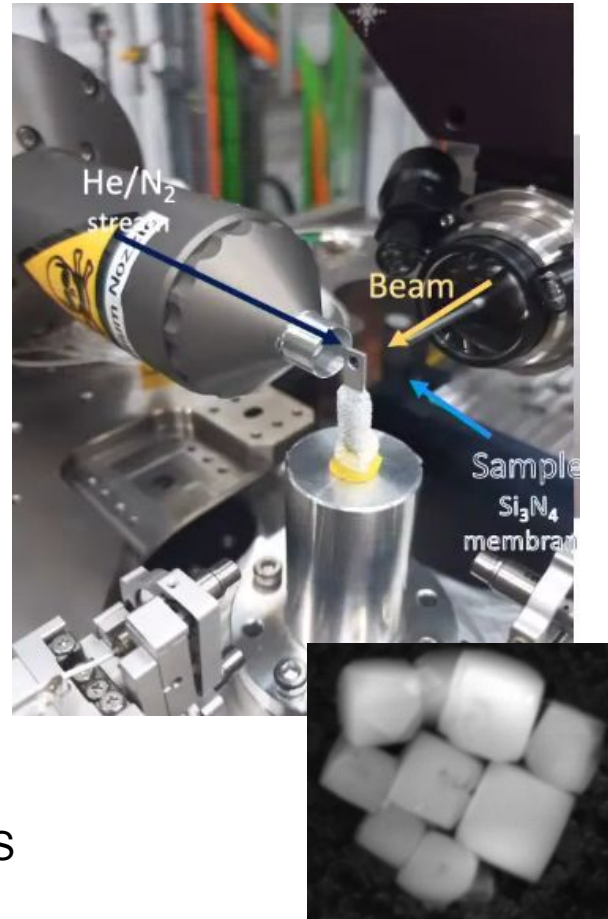
- Acquisition tab: Contains the save file and main acquisition configuration functions
- Settings tab: Provides important detector configuration functions
- Restoration tab: Contains input parameters to the restoration process
- The acquired image is saved in HDF5 format

# PIMEGA DETECTOR: Sírius light source

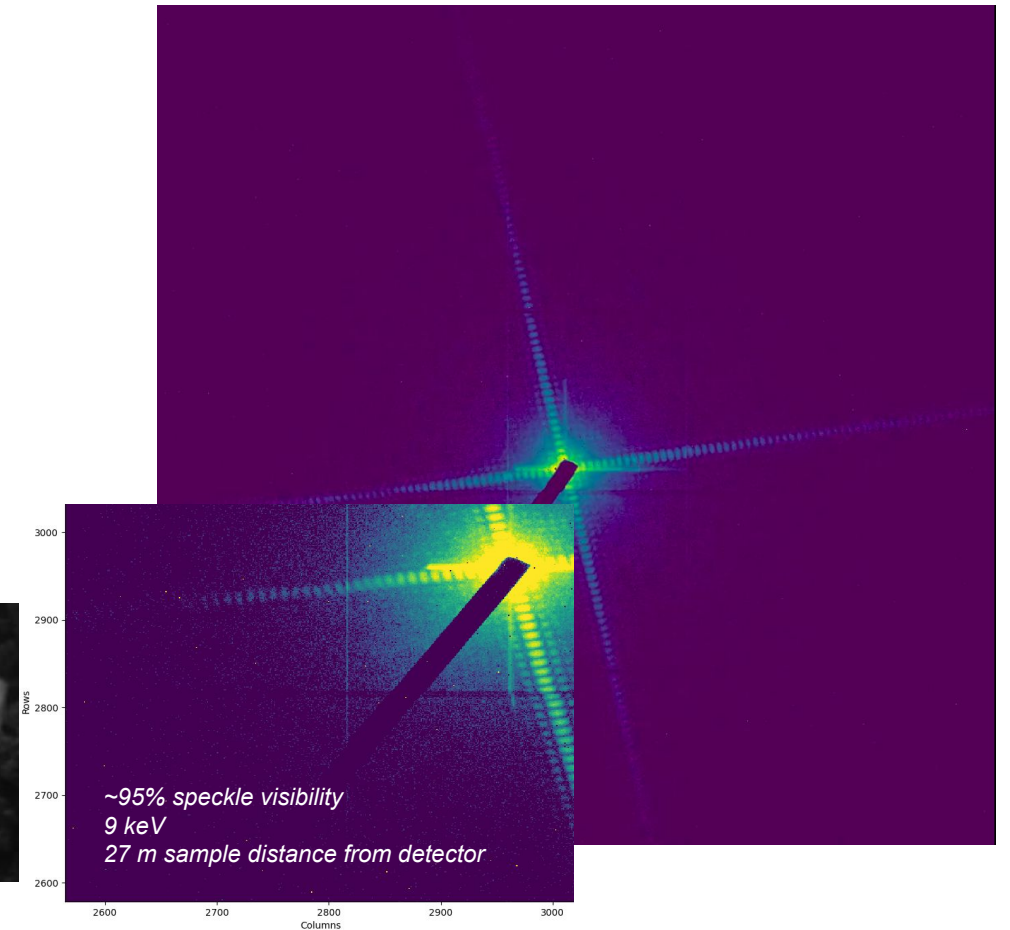
Credits: Giovanni Baraldi - GCC - CNPEM/LNLS



Credits: Detector Group (DET) - CNPEM/LNLS



Zeolite microcubes

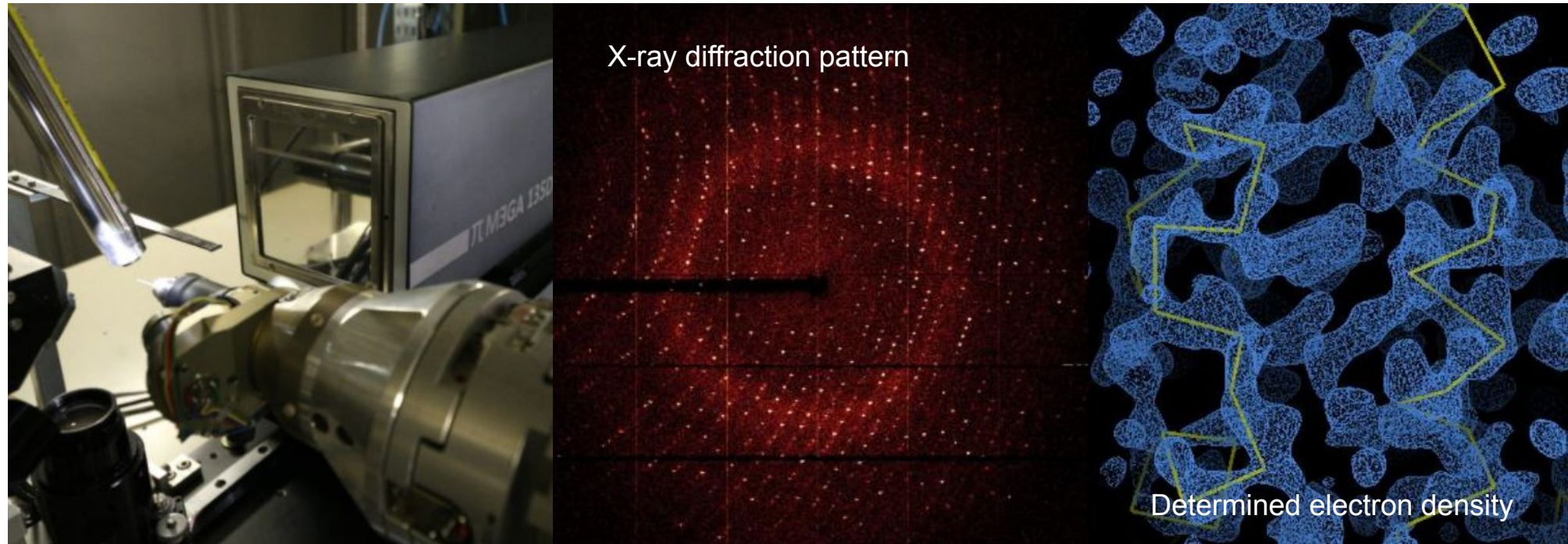


Diffraction pattern measured by PIMEGA 540D



# PIMEGA DETECTOR: Sírius light source

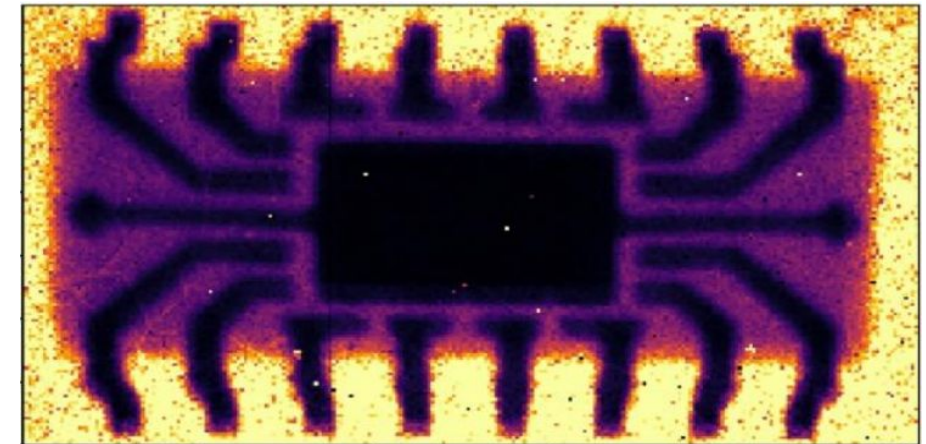
## Protein Crystallography



Credits: <https://cnpem.br/wp-content/uploads/2019/09/RelatorioCG-2019-Parte-IIeIII.pdf>

# PIMEGA DETECTOR: Sírius light source

## X-ray imaging



Raw Image: Geometrical features are clearly visible

Credits: Detector Group (DET) - CNPEM/LNLS

[1] Lucas Sanfelici, et. al. AIP Conference Proceedings 2054, 030033 (2019) <https://doi.org/10.1063/1.5084596>

[2] Allan Gilmour, William Araujo, Jean Polli <https://doi.org/10.18429/JACoW-MEDSI2018-WEPH12>

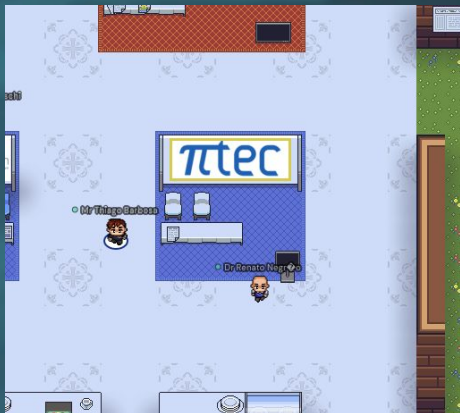


# Thank you!

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# πtec



# PI-TECNOLOGIA: ADVANCED DETECTOR SOLUTION



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National Synchrotron Light Source Sirius (LNLS Campinas)



Sirius storage ring