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**AIDA-2020**

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**Poster**

# Lycoris: Large Area Silicon Strip Telescope

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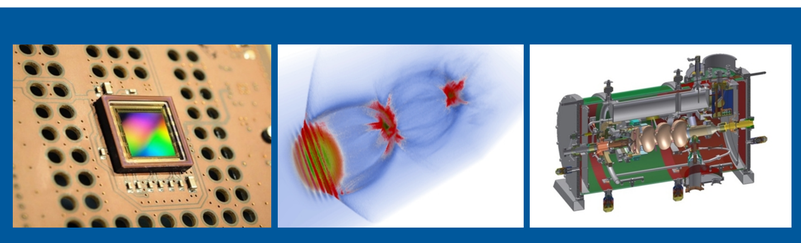
Programme Matter and Technologies

# Lycoris: Large Area Silicon Strip Telescope

4rd Annual MT Meeting - 2018, HZB Berlin

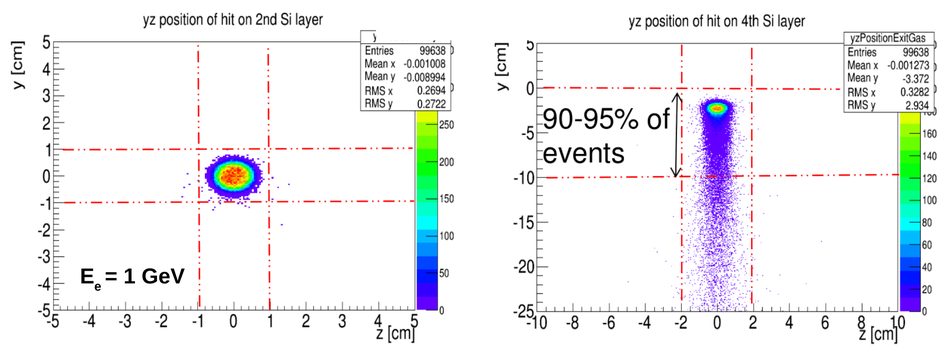


U. Krämer, S. Roelofs
M. Stanitzki, M. Wu

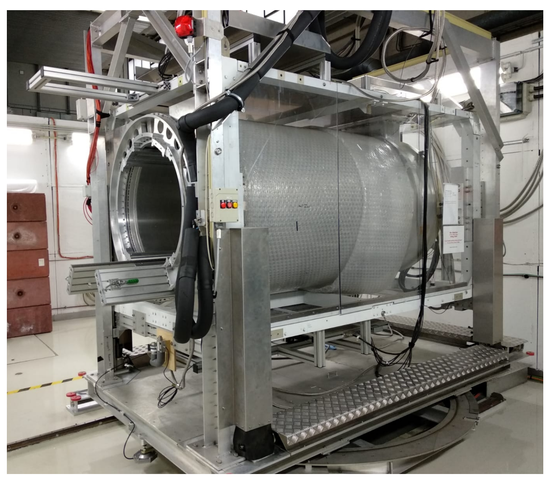
## Requirements

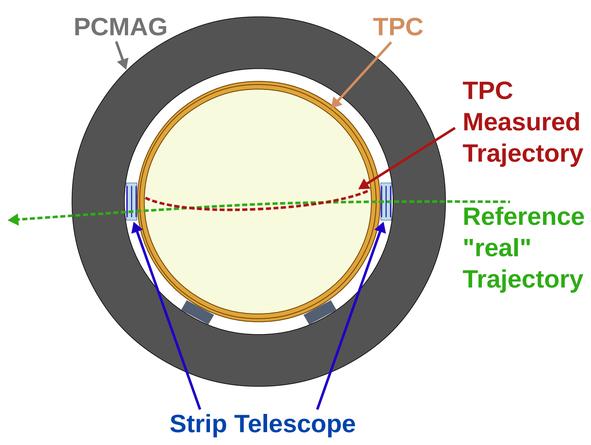
AIDA2020 project: design and commissioning of the Lycoris silicon telescope for the DESY II Test Beam Facility.

- A large coverage of at least 10 cm




- Limited usable space together with large DUTs (TPC) inside the magnet bore: thickness ≤ 3.5 cm
- Spatial point resolution of better than
  $\sigma_y$ = 10 µm - along bending direction in magnetic field
  $\sigma_z$ = 1 mm - along magnetic field axis
- Sensor layers under stereo angle of +2°, -2°, 0° (for z resolution)






## Sensor and Readout

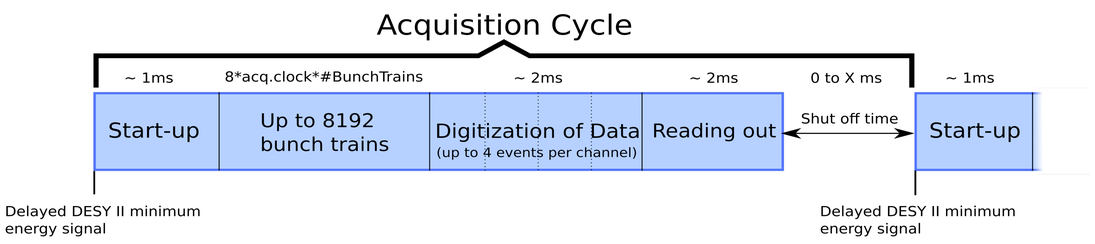
Based on the requirements, a silicon strip sensor designed by SLAC for an ILC environment has been chosen:

### SiD Strip Sensor

- 10 x 10 cm² active area,
- 3680 strips → strip pitch of 25 µm → resolution of ~7 µm
- Alternate strip read out → 1840 active strips
- Thickness of 320 µm → material budget of 0.3% $X_0$
- Signal routing through metallization layer

### KPiX Readout Chip

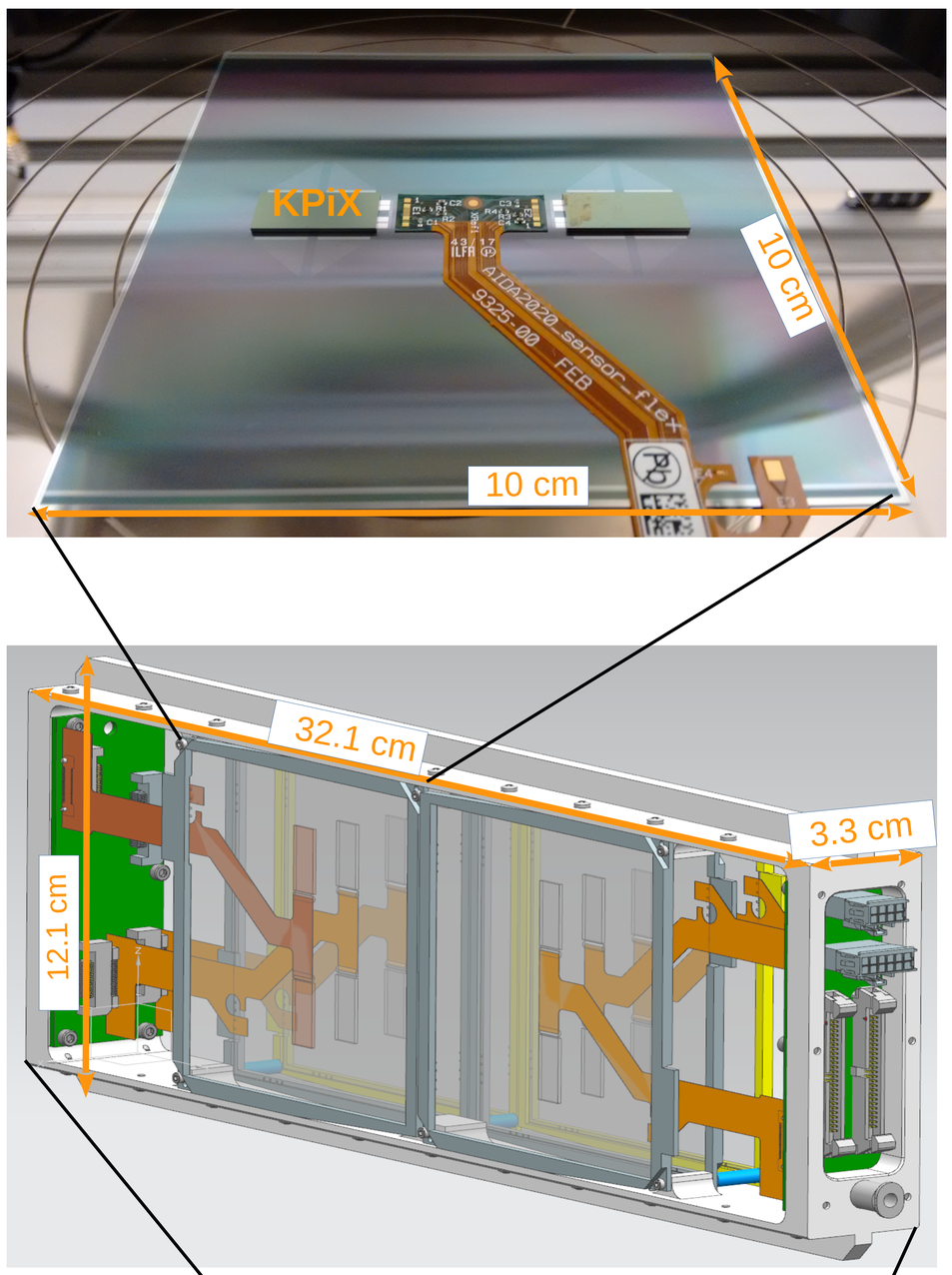
- Integrated pitch adapter and digital readout chip: KPiX
  ↳Directly bump bonded to sensor surface
- 1024 channels per KPiX, 13 bit ADC resolution
- 100 MHz clock → ~3 ns time resolution
- Two triggering modes: self- and external triggering
- Operates in power pulsing




## Lycoris telescope

Design parameters of the large area strip telescope:

- 10 x 10 cm² sensors, 2 KPiX chips bump bonded on each
- Telescope consists of 2 cassettes, one on each magnet side with
  6 sensors grouped in 2 stacks → sensitive area: 10 x 20 cm²
- Cassettes installed in a rail structure within the PCMAG
  - Movement along B-field: ~ 2 m
  - Rotation along circumference: ~ 45°
- Readout system integrated in common EUDAQ framework

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