TITLE:    **Beam diagnostics with silicon pixel detector array at PADME experiment.**

ABSTRACT:

During 2022 data taking (Run 3) PADME searched for a resonant production and a visible decay of the X17 particle into e+e-.
A precise knowledge within 1% uncertainty of the number of positrons was required for the observation.
To that purpose, an array of 2x6 Timepix3 (total of 512 x 1536 pixels) hybrid pixel detectors operated in data-driven mode with ToA resolution of 1.56 ns for every pixel was employed.
Two methods for data acquisition were developed. A frame-based method, integrating the number of hits for each individual pixel for a predefined period of time served for monitoring of the beam conditions and a rough estimation of the beam distribution and number of positrons. A data streaming mode exploiting the nanosecond time resolution of Timepix3 detector was used for precise characterization of the transverse beam profile and the distribution of the incident positrons within each bunch of positrons of ~200 ns duration.
The framework design and the achieved beam diagnostics performance for both data acquisition modes will be presented and discussed.