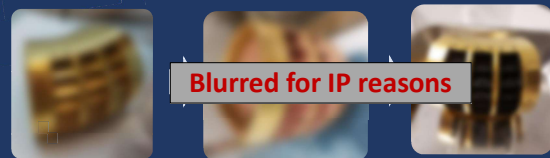
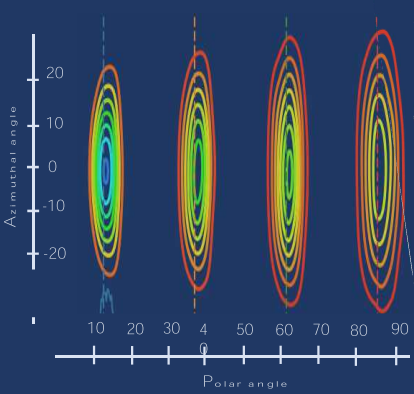


Need for fast and 3D measurements of the electrons & ions in LEO in range 0 - 30keV with a compact instrument

3DCAM : A high resolution 3D camera for ions & electrons To be flown in 2026 on the ESA Space Safety Program demonstrator

- Instantaneous 3D field of view, 360°x90°
- 16cm x 10cm : below 4U small sat standard
- $4 \cdot 10^{-4} \text{ cm}^2 \cdot \text{str. eV/eV}$ Geometric factor
- Up to 24keV max energy for ions and electrons
- Manufacturing using stereolithography
- < 2W of overall power, < 1.5Kg



Optimization methods

Creation of a parametric code to generate variants

Investigation of the electrostatic model using SIMION to solve Laplace equations

Fly electrons using home-made particle pusher (4th order Runge-Kutta Method)

Calculate electrostatic the performances of theoretical model

Evaluate next iterations

Blurred for IP reasons

Detection system

Conversion foil

Acceleration grid

MCP detection

Ion-electron basic conversion principle

Energy response (eV)

Azimuth response (°)

Total hits

Black coating

Micro-Channel Plates are sensitive to the Lyman-alpha ray ; blackening of surfaces are necessary to absorb the UV-lights.

The coating developed has a "leaf-like" shape of around 100nm : the Li- α wavelength.

2 μm

EHT = 3.00 kV
WD = 5.2 mm
Signal A = SE2
Width = 50.00 μm
Date: 6 Jun 2023
Mag = 2.29 K X