FIRST TESTS OF LENS PROTOTYPE IN WATER

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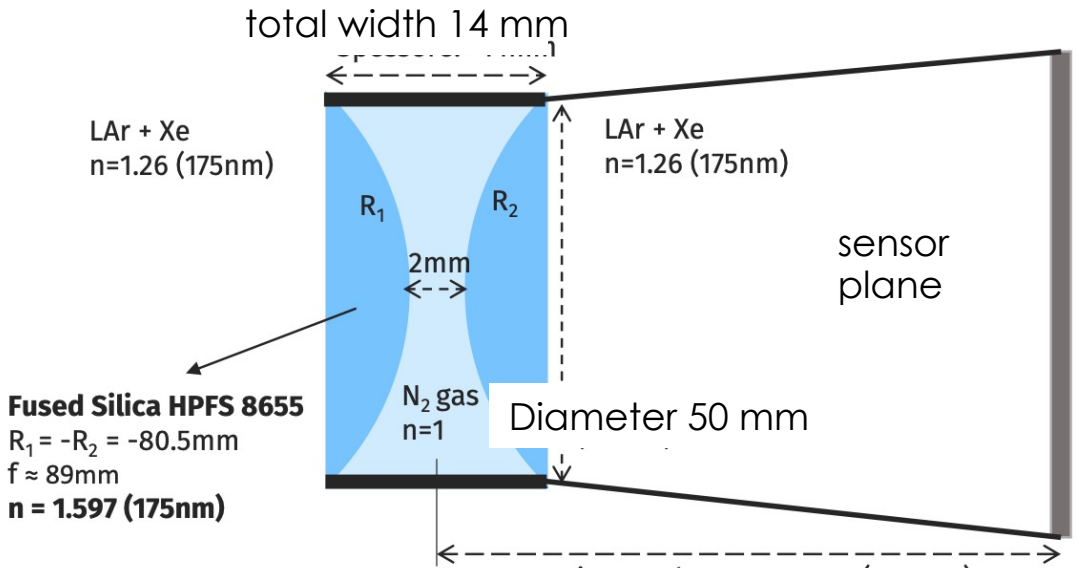
on behalf of Genova group

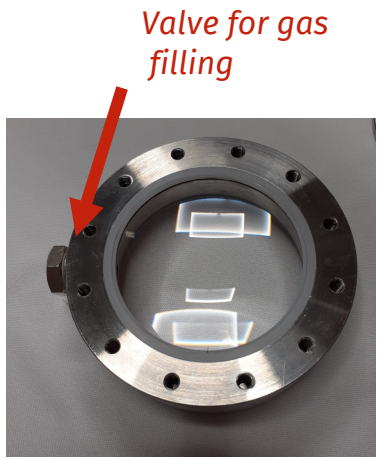
GRAIN WG Meeting – Jun, 30th 2022

THE PROTOTYPE

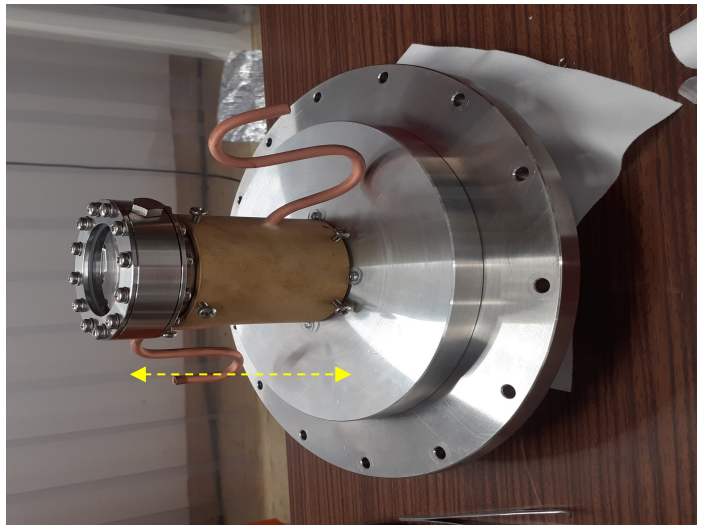
- The built prototype is the same used for SAND-GRAIN simulations
- Lens produced by **GestioneSILO**
  - Materials: **Fused Silica HPFS 8655. (n=1.57)**
  - $R_1 = R_2 = -80.5$mm
  - $f \approx 89$mm in LAr (n=1.26-1.4)



Adjustuble lens-sensor plane distance: b 8-15 cm

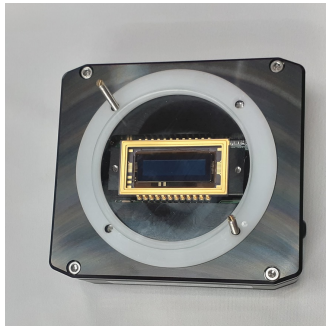


Lens support designed by R. Cereseto (INFN-GE)



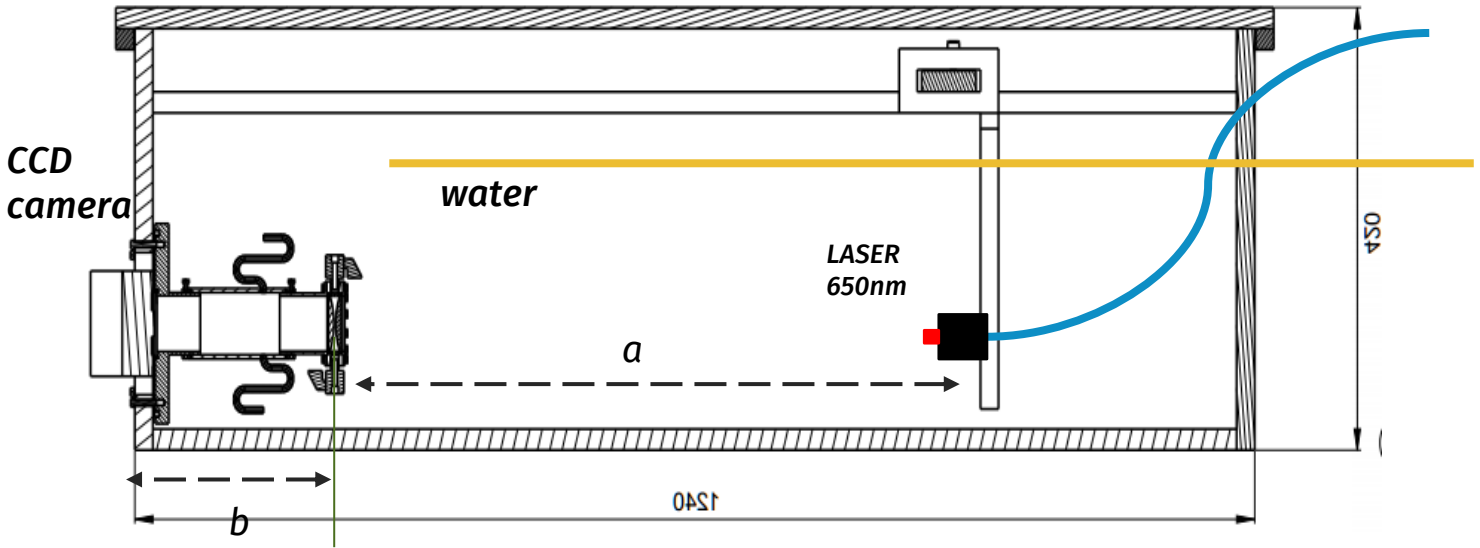
THE SET UP

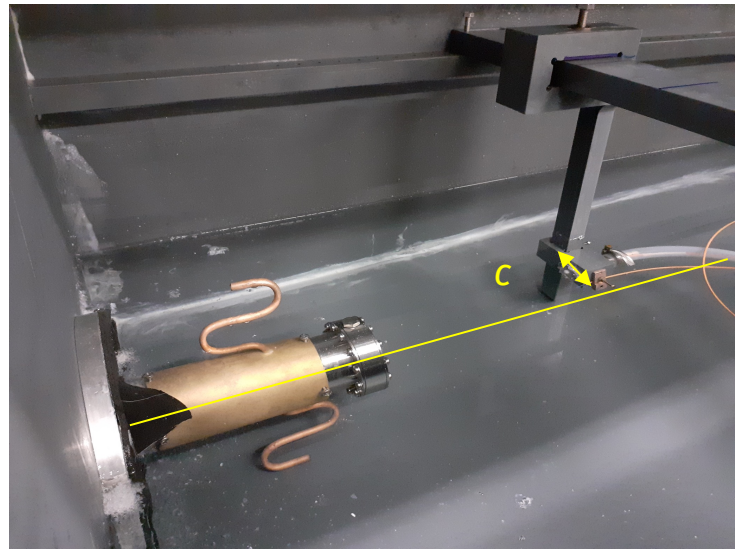
- **Visible light source (650 nm)**
  - trasported on fiber
  - movable position inside the box volume (a, b, c variable)
- **In water** → (n_lens=1.45 n_water=1.33, bigger focal length f=118 mm)
- **with a CCD camera** (sensible to UV or visible light)



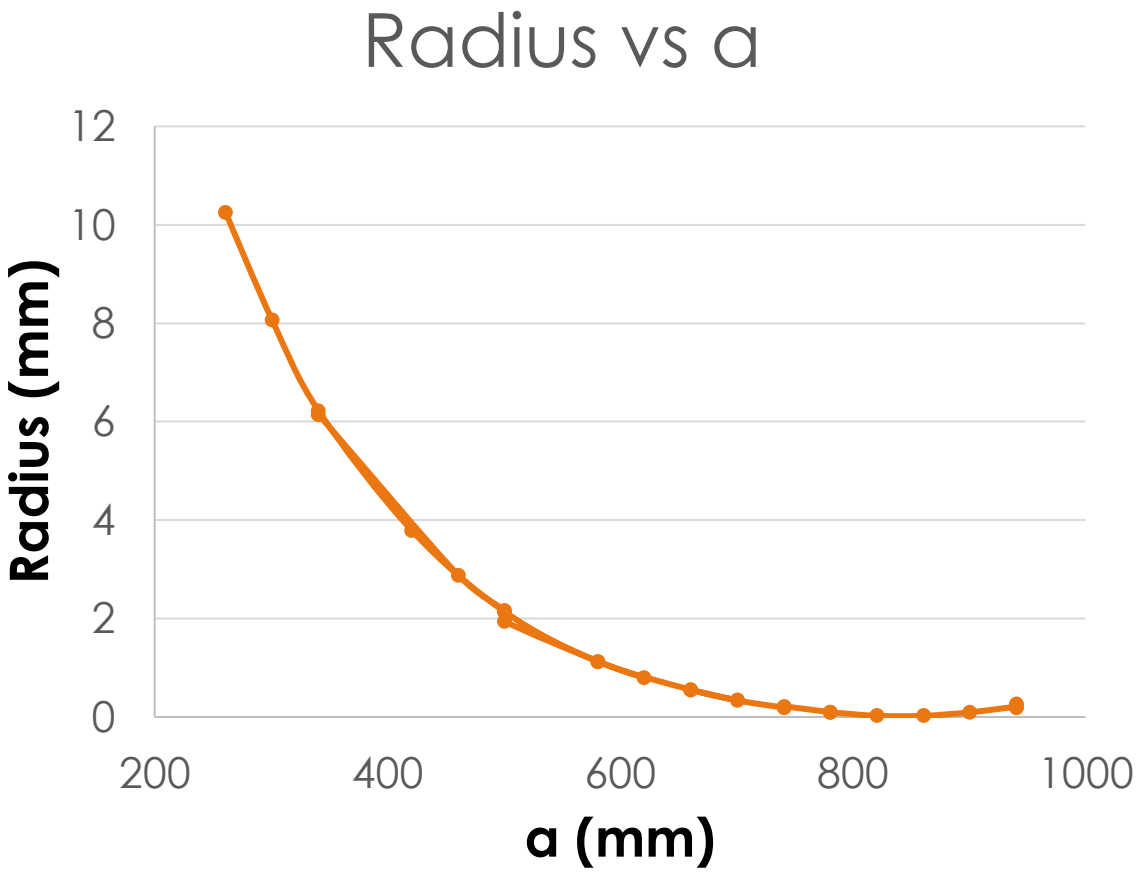
CCD (UV-visibile)
Dim: 24 mm x 12 mm

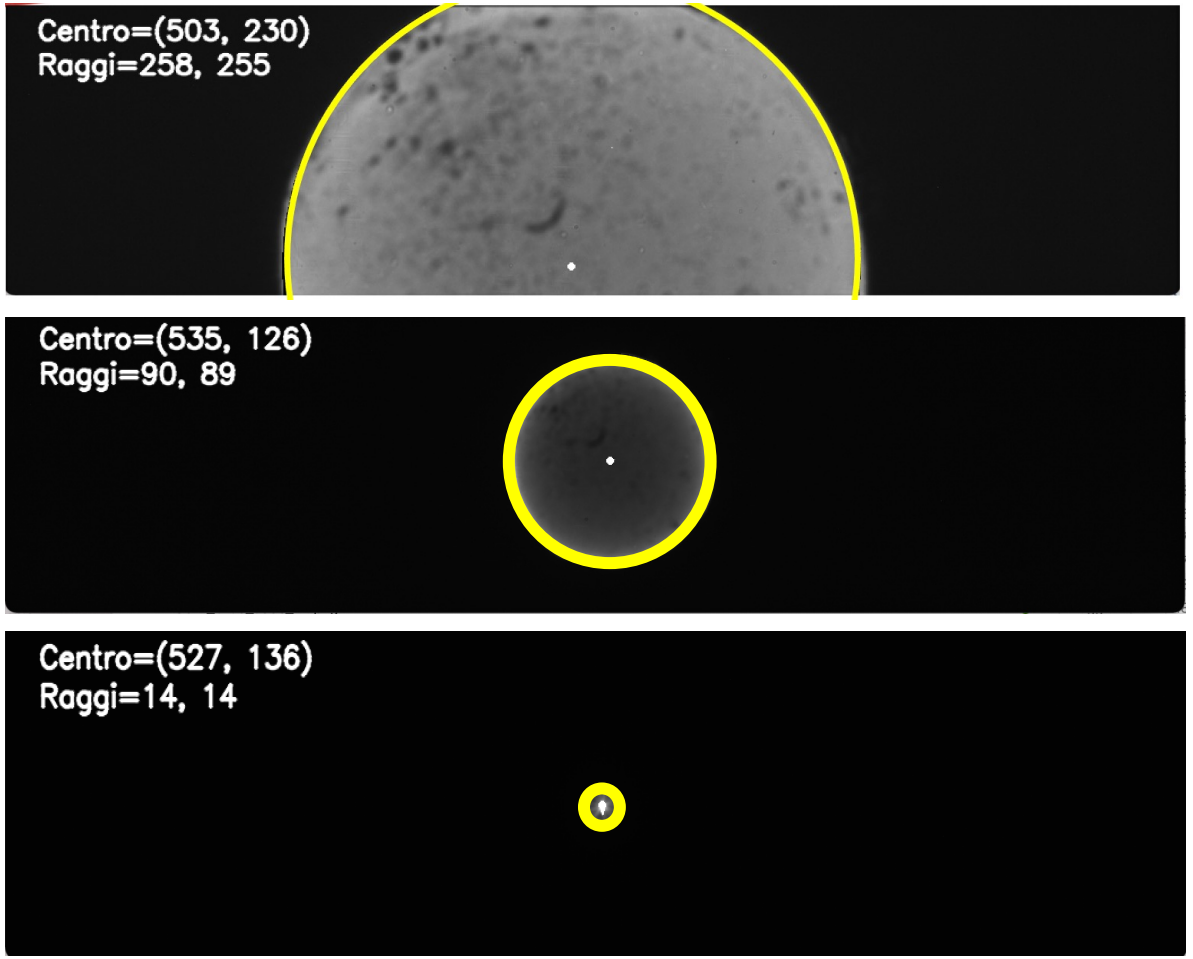
- **GOAL:** test simulations results in therm of field of view and focusing





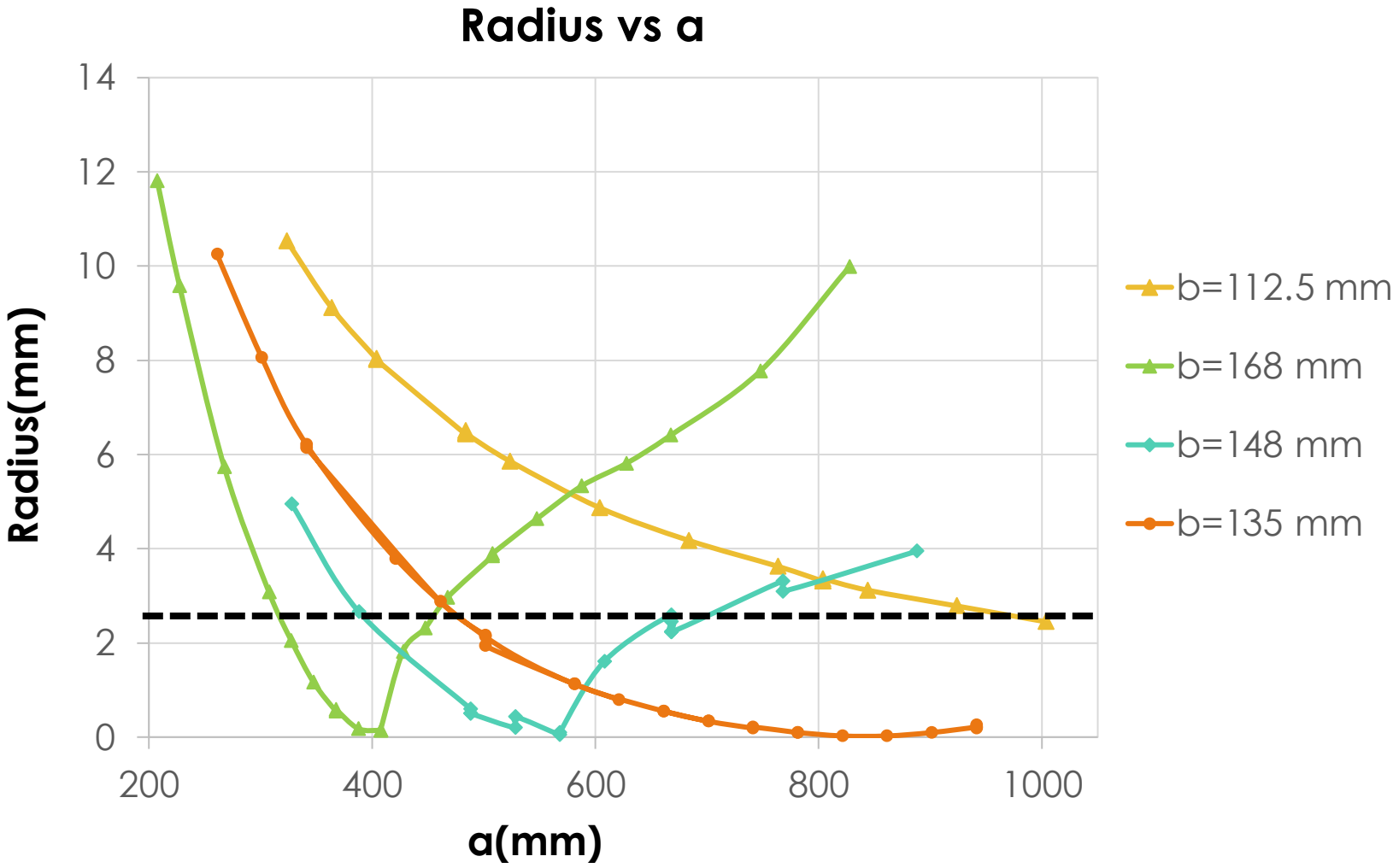
THE FOCUSING EFFECT





THE FOCUSING EFFECT

for different b values



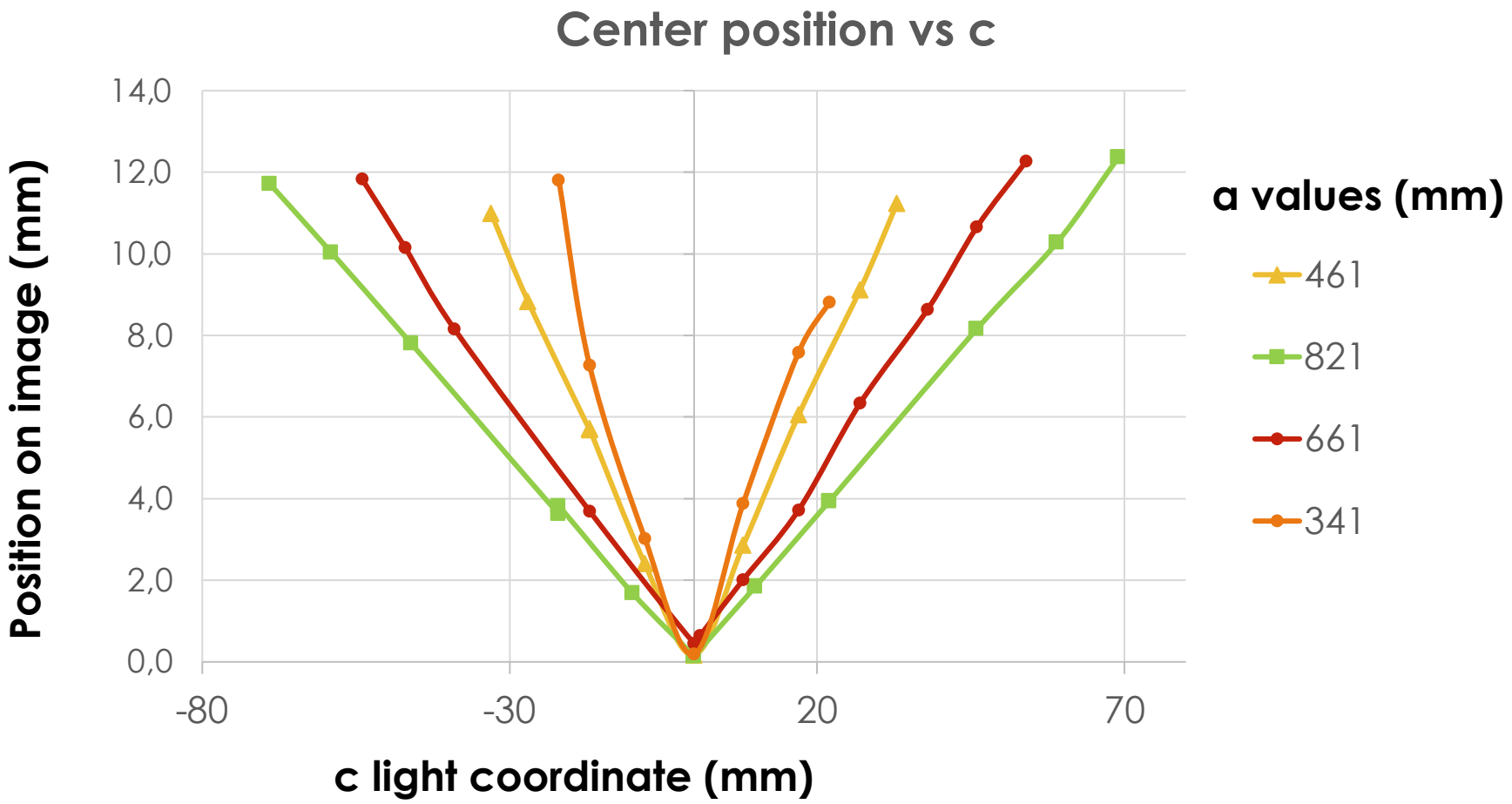
b=148 mm is expected to work as b=10 cm in LAr with UV light

From simulations: r<2.5 mm from a=400 mm to a=800 mm

Here: a=400 → a= 730 mm

THE FIELD OF VIEW

for b= 135 mm

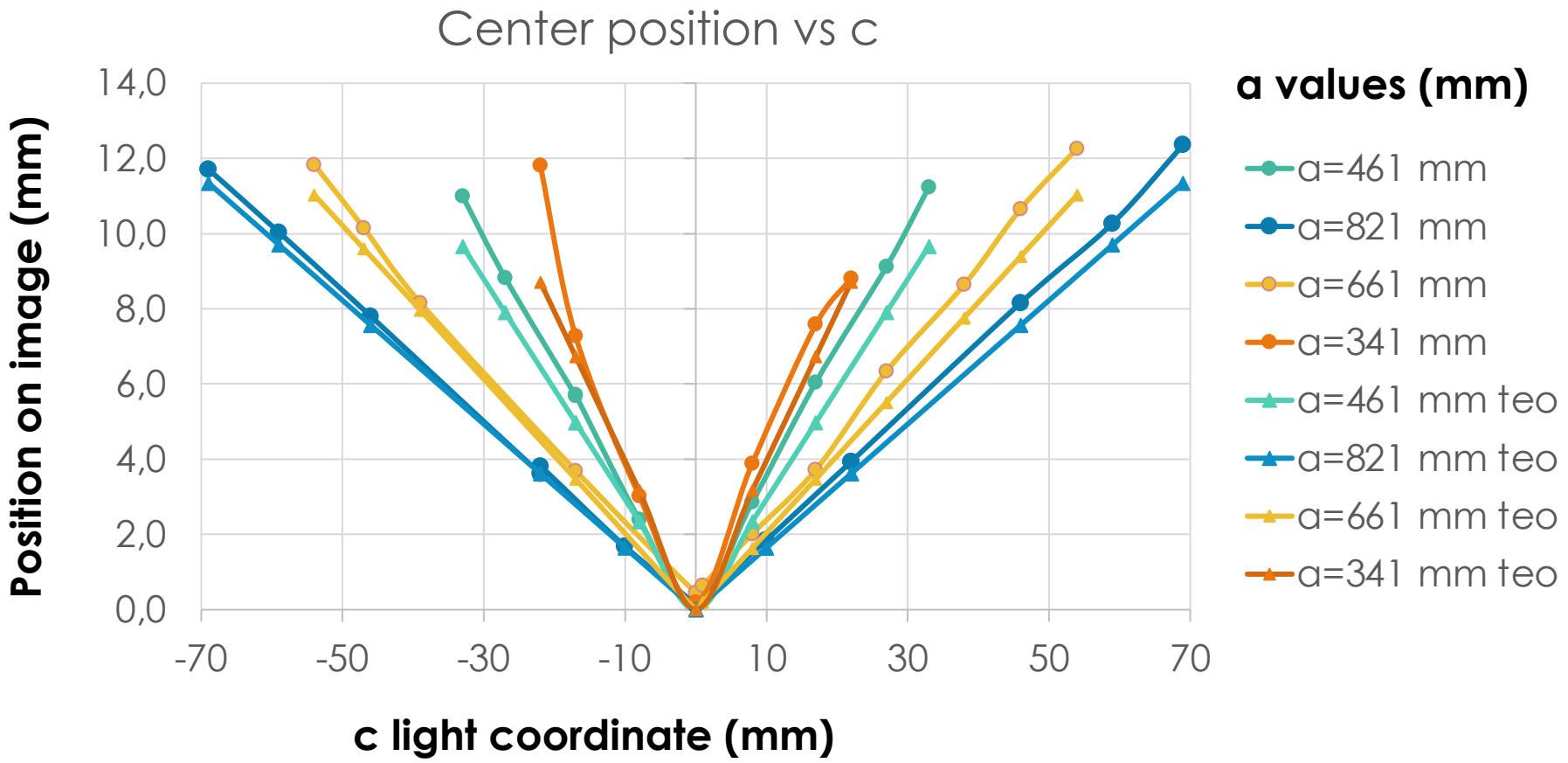


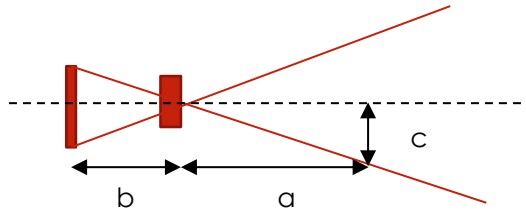
The field of view increases with a as expected

THE FIELD OF VIEW

for b= 135 mm

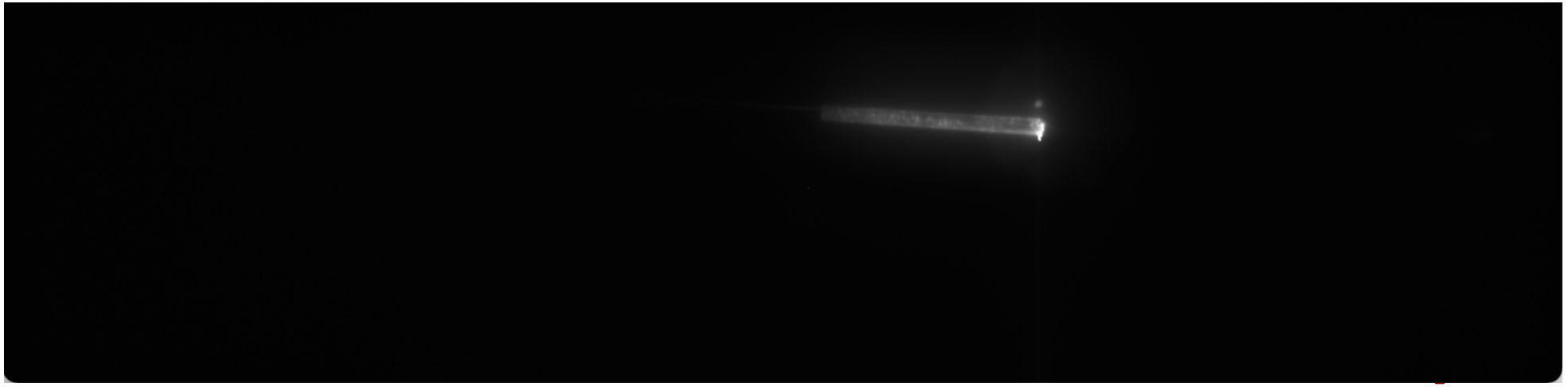
Comparison with the expected (teo) values

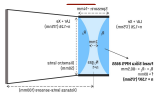




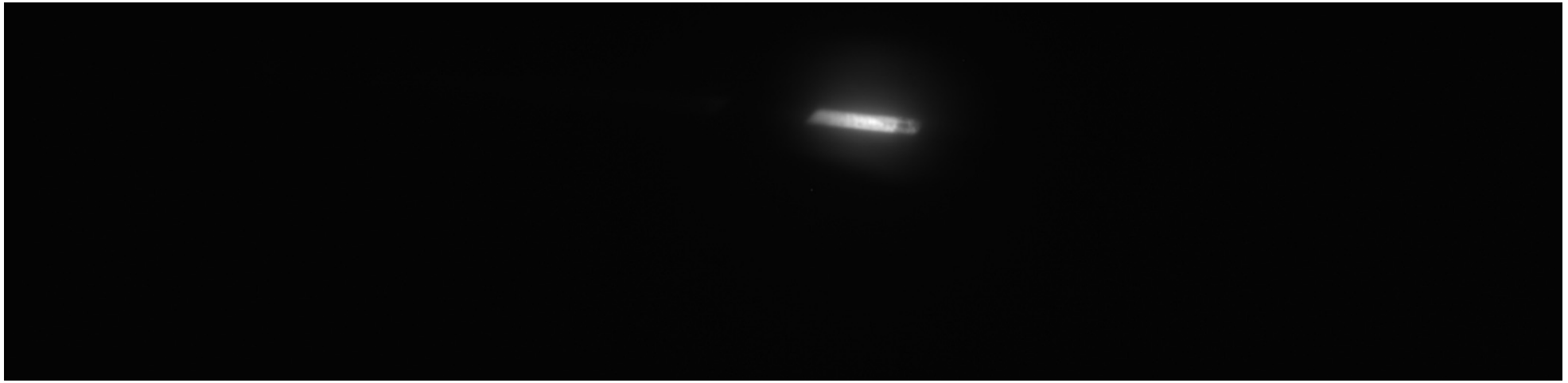
Pos_image=a/b*c

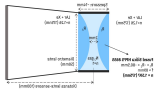
FIRST TRACK IMAGES





0°





60°

NEXT STEPS

- Improve the data analysis (more data to be added)
- Run simulations for the same data configuration
- Perform other tests with other lens prototype
  - (bi-convex lens with gas between sensor and lens)