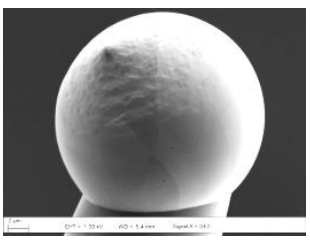
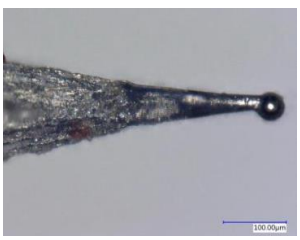
Application Note

SpheryCal: SMARGON calibration real 3D, fast, more accurate and stable

SpheryCal: unique tungsten microspheres

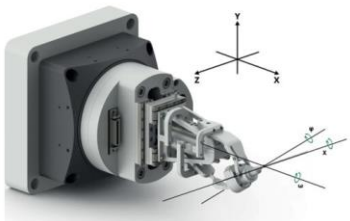
- Invented, patented and produced by SOLEIL
- Size ~ 5 to 100µm
- Functionnalizable microfiducial [ask for details]
- No equivalent on the market
- Applications: X-Ray microscopy, diffraction, tomography, imaging,…





SMARGON calibration on PROXIMA-1 beamline

- PROXIMA-1: MX beamline at SOLEIL, equipped with SMARGON
- Key feature of the SMARGON: small sphere of confusion
- **SpheryCal is a true 3D fiducial**
- Sphere of confusion can be x4 smaller compared to 2D fiducial
- Using Microtip and specific routines:
  - rapid (~5min) creation of look-up table (LUT) for position correction
  - position performance of the SMARGON can be readily re-verified, if needed
- LUT creation carried out under cryo-jet (100K), exact same conditions as for real sample



SUMMARY

- SOLEIL offers **SpheryCal from ~5µm to ~100µm diameter**
- Tungsten “spheres” can be custom **mounted on a sample holder system of choice**
- **Tests** have been conducted at SOLEIL, ESRF and MAXIV **on hard x-ray beamlines**
  - ✓ With a SMARGON goniometer, the **alignment of the sphere of confusion can be ameliorated by a factor of ~4 in a few minutes daily** (via LUT)
  - ✓ Tomography has shown that our objects contain irregular deca-nano voids This enables them to serve as robust 3D-standards for X-ray tomography
  - ✓ Tests at ESRF have shown, that it is possible to descend below a µm-sphere of confusion (LUT) by purely optical methods present on a typical beamline

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