



Ruska's Day • Gazette QEM2025

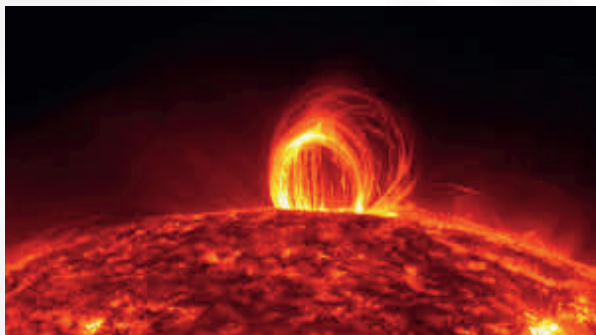


Otto Scherzer (1909 – 1982)

After WWII, Scherzer published a milestone paper (1947) in which he described several ways of correcting Cs – cylindrical lenses and octopoles (later replaced by quadrupoles and octopoles), high-frequency lenses, space charge or thin foils, mirrors. Sextupoles were not mentioned but in 1965, Peter Hawkes pointed out that they possess an aberration that could be exploited for correction. This was taken up by Beck and Crewe in Chicago and by Scherzer's successor Harald Rose; from it the family of CEOS correctors has emerged. Quadrupole–octopole correctors are used in the Nion STEM. A major attempt to correct spherical and chromatic aberration by means of quadrupoles and octopoles was made in Darmstadt under Scherzer's direction during the 1970s and achieved a good measure of success, but with Scherzer's death, funding ceased and the project was abandoned.

It happens the same day

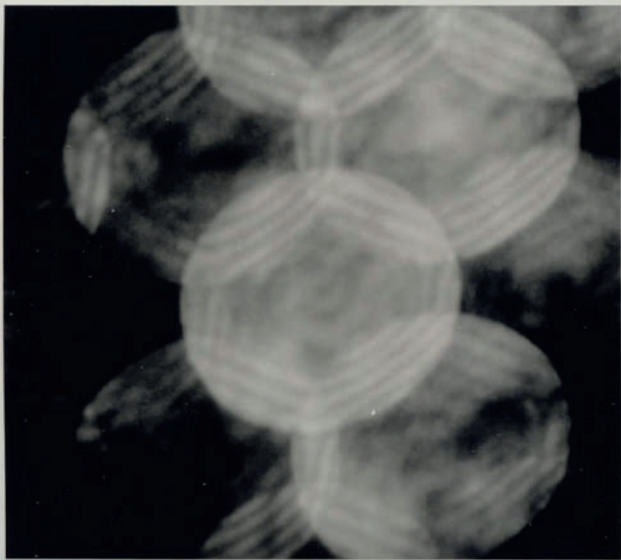
In 2024, The NASA Tracked the Most Intense Solar Storm in Decades



Today's Program

- 8:30** Differential Phase contrast
by Knut Müller-Caspary
- 11:00** Ptychography
by Peter Nellist
- 13:00** Cup of TEM
with Peter and Knut
- 14:00** Direct Electron Detection
D. Stroppa
Nanos Table Top Demonstration
EDEN Instruments
- 16:00** Practicals

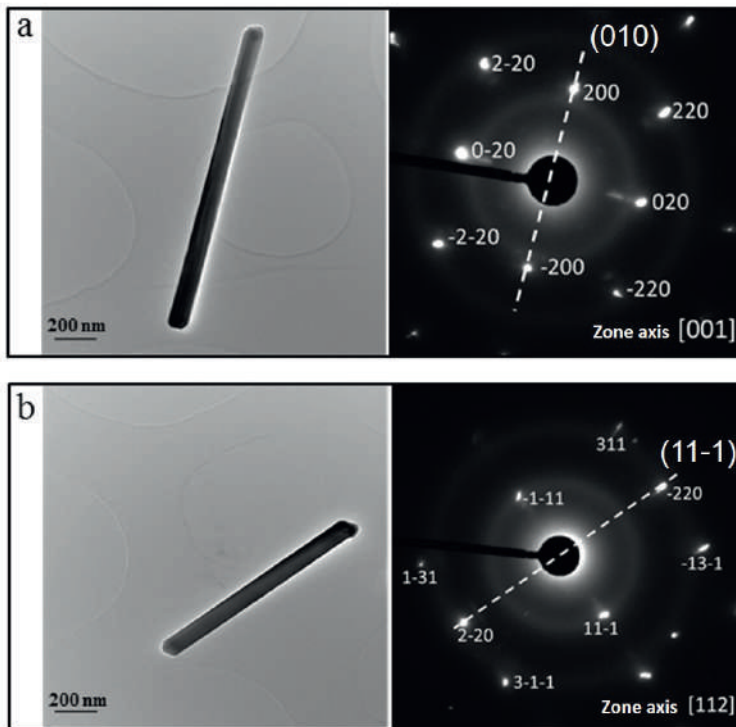
Image of the Day



At the end of the day you will understand everything there is to understand in this beautiful mysterious 2D diffraction patterns from a sub-area of several Au atomic columns
H. Yang et al, Ultramic. 180, 173-179, (2017)

Solution of yesterday's enigma

Direct and reciprocal spaces are 3D !!



From images a, we know that the anisotropy axis is contained in the (hkl) plan that contains the $[001]$ and the $[200]$ directions.

So $l = 0$ and $h = 0$. Then, this plan is (010)

From images b, we know that the anisotropy axis is contained in the (hkl) plan that contains the $[-220]$ and the $[112]$ directions.

So $h = k$ and $h + k + 2l = 0$. Thus, this plan is $(11-1)$

Therefore, the anisotropy direction of the nanorod $[u,v,w]$ is the intersection of the (010) and $(11-1)$ planes. So $v = 0$ and $u + v - w = 0$. The anisotropy direction of the nanorod $[1,0,1]$!!

Teacher's Interviews

Peter Nellist

Best memory of electron microscopy?

The first time I saw interference fringes formed in an electron microscope (see image). For hours afterwards, every time I closed my eyes I just saw those fringes. So electrons really are waves, or perhaps not (see Q4)!

How a microscopy lab will look like with AI in 20 years?

My AI chatbot says that it will be smaller, smarter and more integrated.

Aside from Cathodoluminescence, which techniques have you always wanted to learn but haven't?

Off-axis holography. See – I am obsessed by those fringes.

Wave or Particle?

My decision wavefunction has not collapsed on that question. Perhaps I'll go and ask my cat.

Knut Müller-Caspary

Best memory of electron microscopy?

That was a discussion with Andreas Rosenauer and Josef Zweck how to quantify atomically resolved DPC signals at the MC conference in 2013 – our starting point for atomic electric field measurement by centre of mass.

How a microscopy lab will look like with AI in 20 years?

Largely the same, since people will have noticed the indispensability of Natural Intelligence!

Aside from Cathodoluminescence, which techniques have you always wanted to learn but haven't?

EELS...

Wave or Particle?

We play the dice until a genius will help us overcome quantum mechanics.

Pics of Yesterday

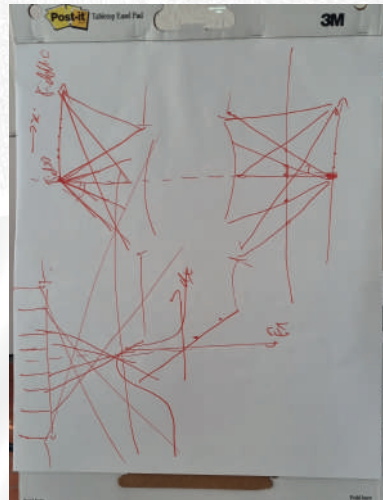


La Pétanque!



Come discover pétanque or perfect your skill! Don't hesitate to ask for a set to play.

Enigma of the day



Where can you see this ? And what does it mean ?

Secret Recipe : The Piña Colada

Ingredient:

5 cl Caribbean white rum,
5 cl filtered fresh pineapple juice
3 cl coconut cream,

Blend rum with crushed ice in a blender or a shaker or a chiller until it becomes creamy, frothy and smoothy... or just order a beer !

When everything starts to separate, it is time to :

- 1°) order another beer for waiting more
- 2°) taste it



difficult choice !

Weather Forecast

21 °C, Cloud, Rain and Sun
(more or less in thats order)



The French Microscopy Society (Société Française des Microscopies - SFμ) is associated to QEM from almost the begining and most of the french people around you will be able to tell you more about the scope and actions of this society. Many thanks to them !