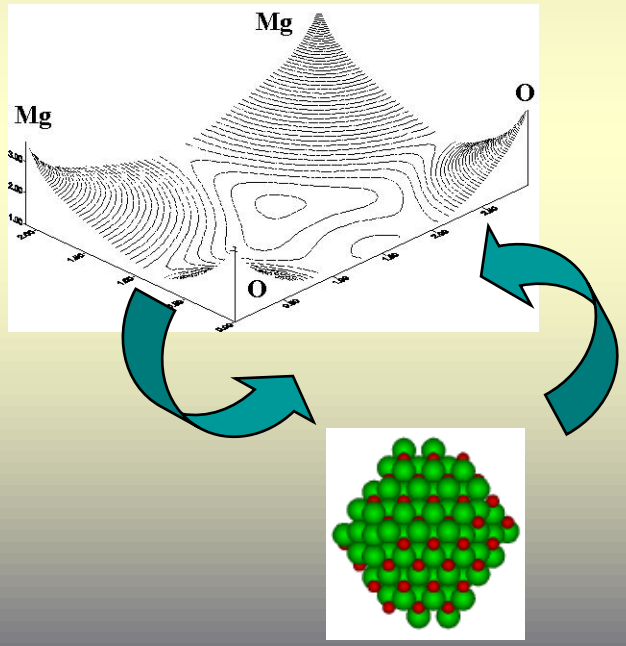
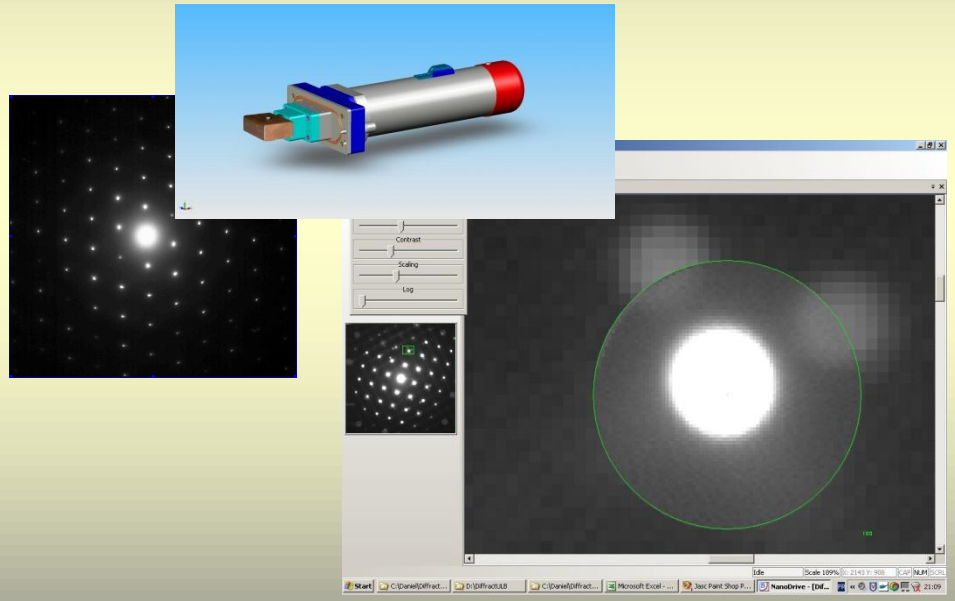
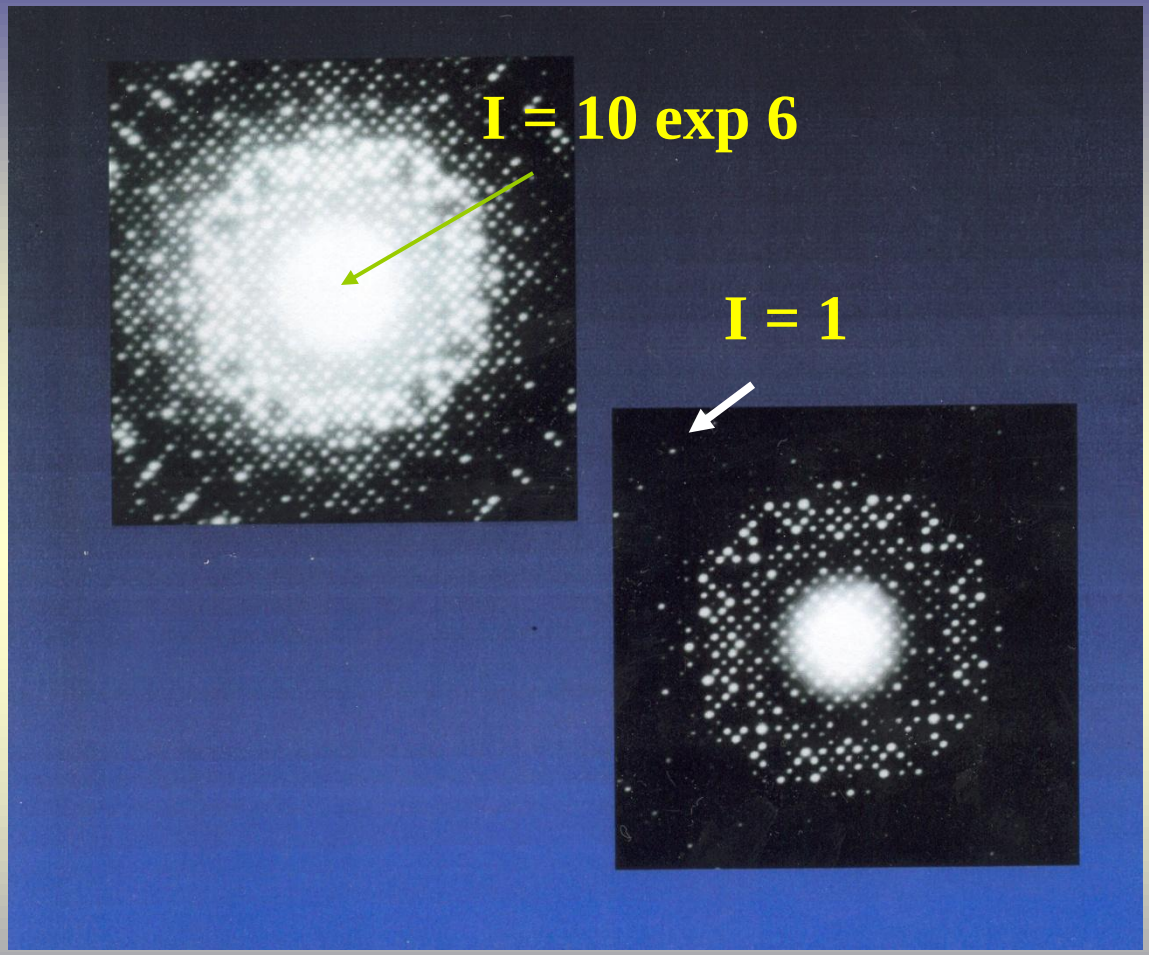
Electron Diffractometer

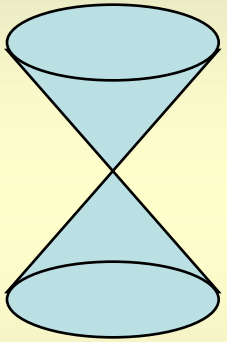
…. The link between atomic structure and physical properties





MEASURING ED INTENSITIES : > 10 exp 6 DYNAMIC ANGE





LIKE IN X - RAY CRYSTALLOGRAPHY FOR ELECTRON DIFFRACTION STRUCTURE DETERMINATION ALL REFLECTIONS MUST BE MEASURED WITH HIGH PRECISION

< 1- 3 %

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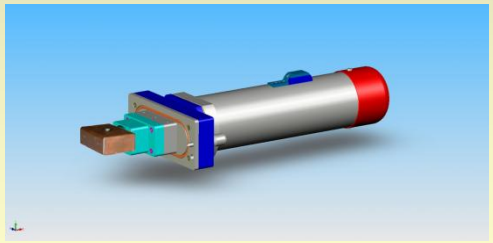
How measure electron diffraction intensities ?

Photographic film (8 bit or 256 grey levels)

CCD cameras (12 bit – 16 bit) or (4096 – 65536 grey levels)

NEW dedicated electron difractometer for PRECISE and reliable collection of electron diffraction intensities



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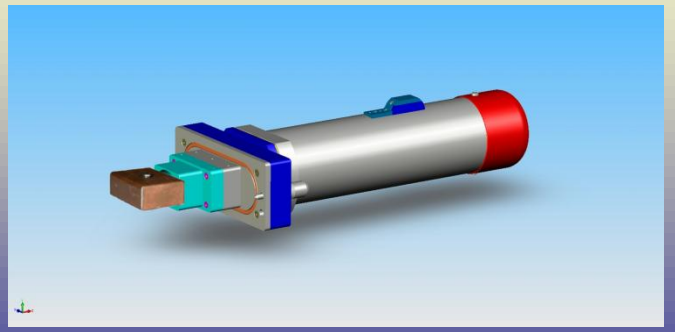
How measure electron diffraction intensities ?

ED pattern is scanned pixel by pixel with a dedicated unit through a specially designed point ultra-sensitive detector

System able to detect 24 bit intensity (16.000.000 grey levels) linearly and without saturation.



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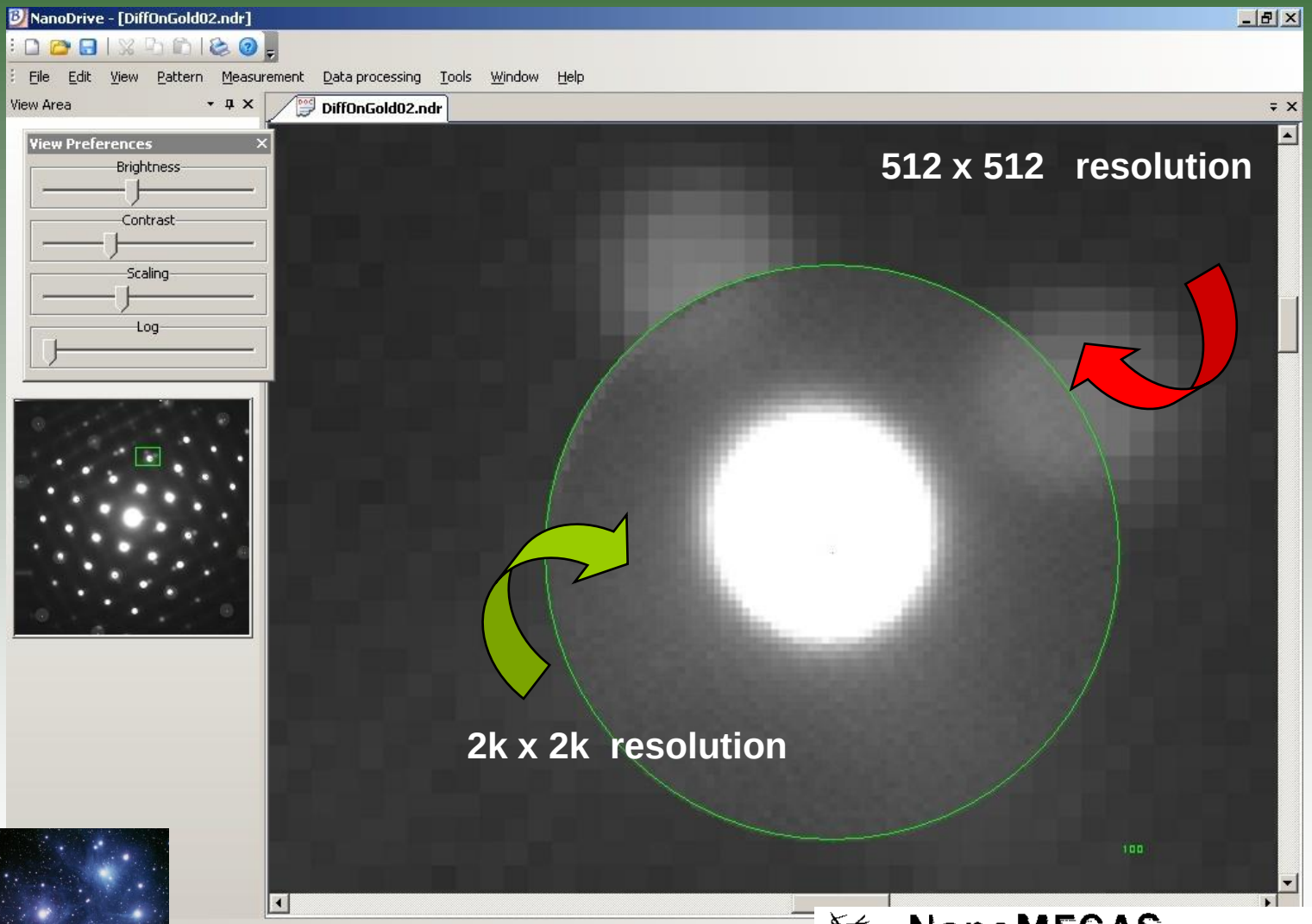
VARIABLE RESOLUTION SCANNING STEPS

MAXIMUM DIFFRACTION PATTERN RESOLUTION 4k x 4k



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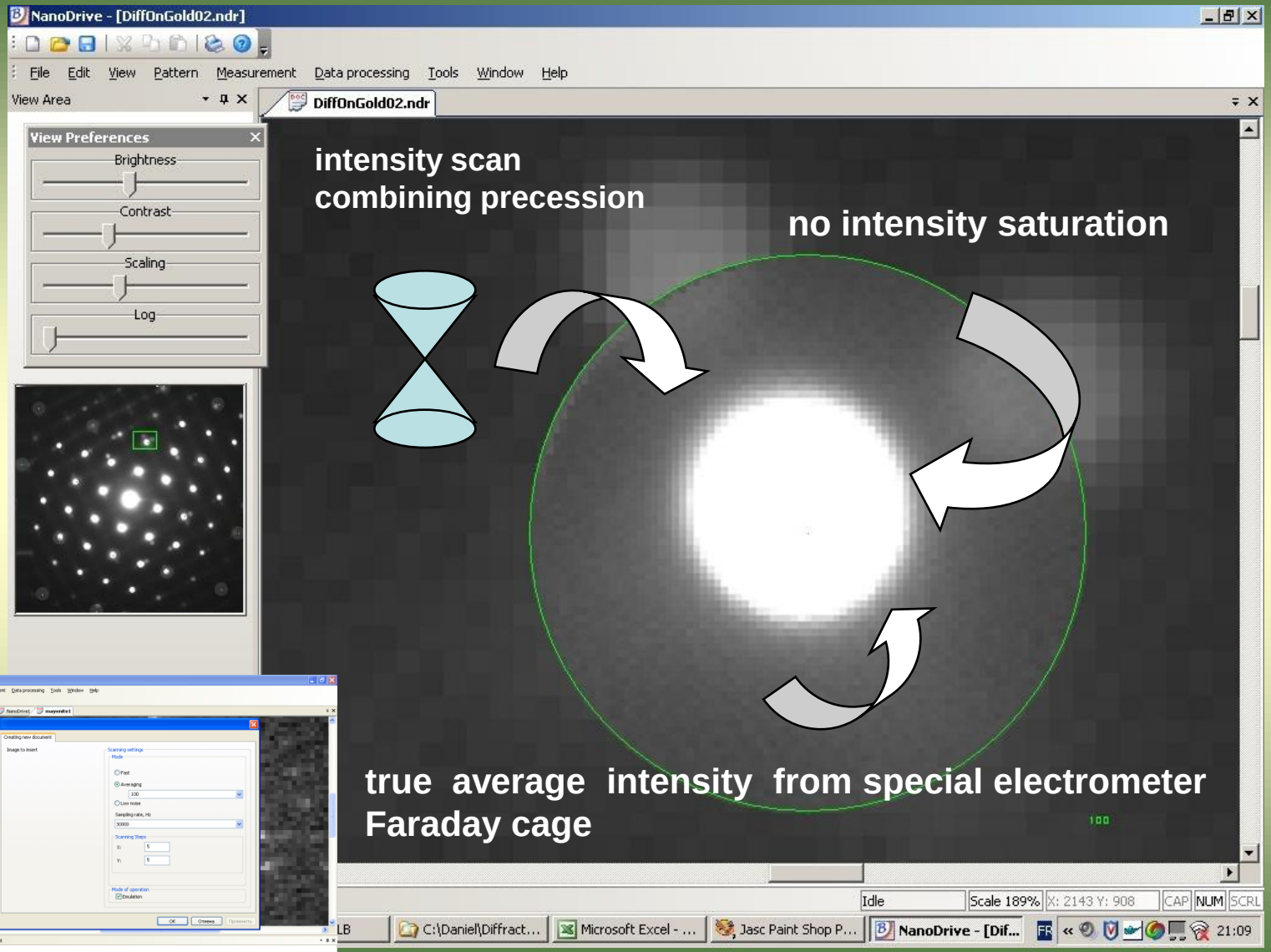
MEASURE TRUE ELECTRON DIFFRACTION INTENSITY



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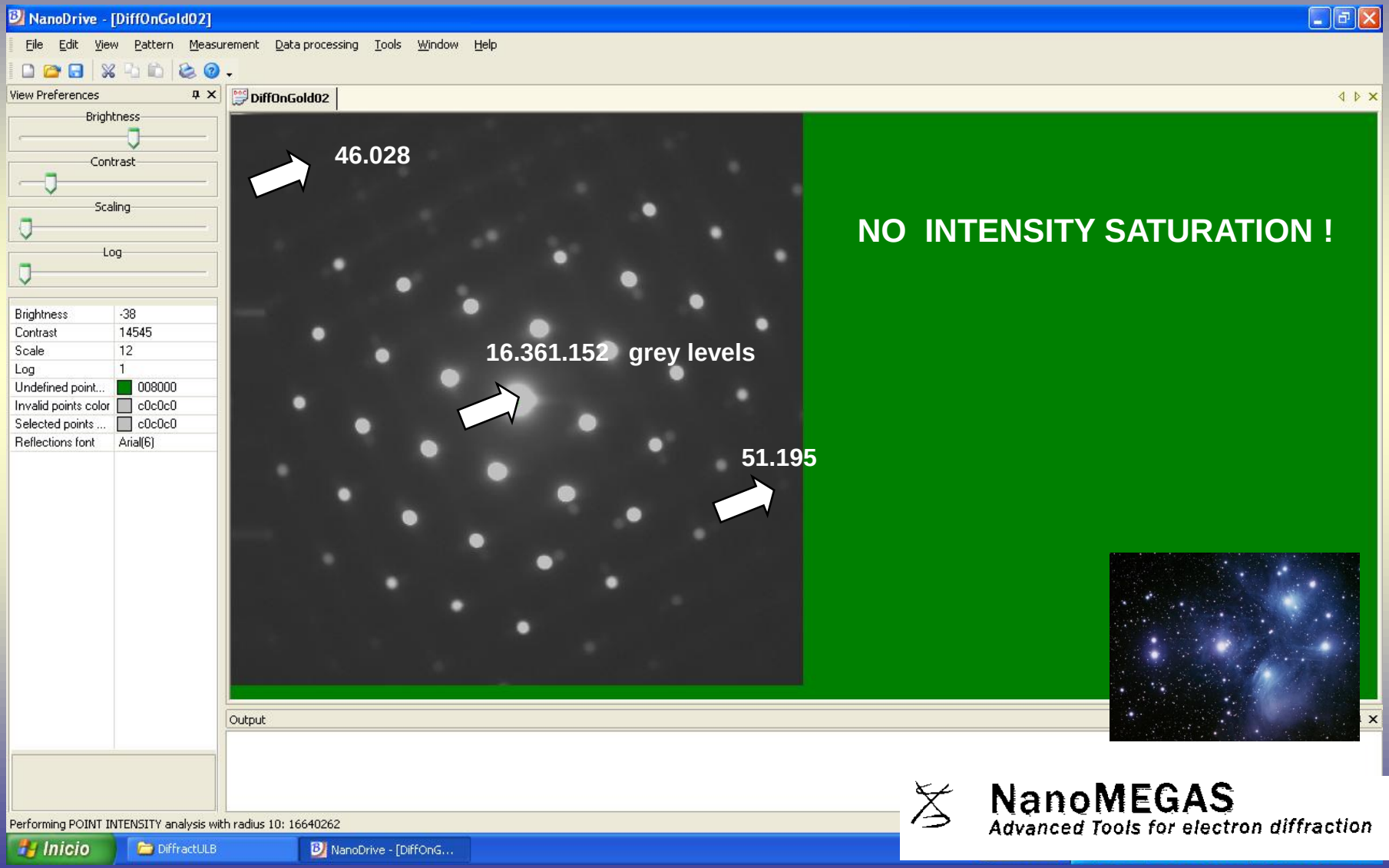
ULTRA- HIGH DYNAMIC RANGE 24 BIT = 16.777.216 grey levels AT ONE SHOT



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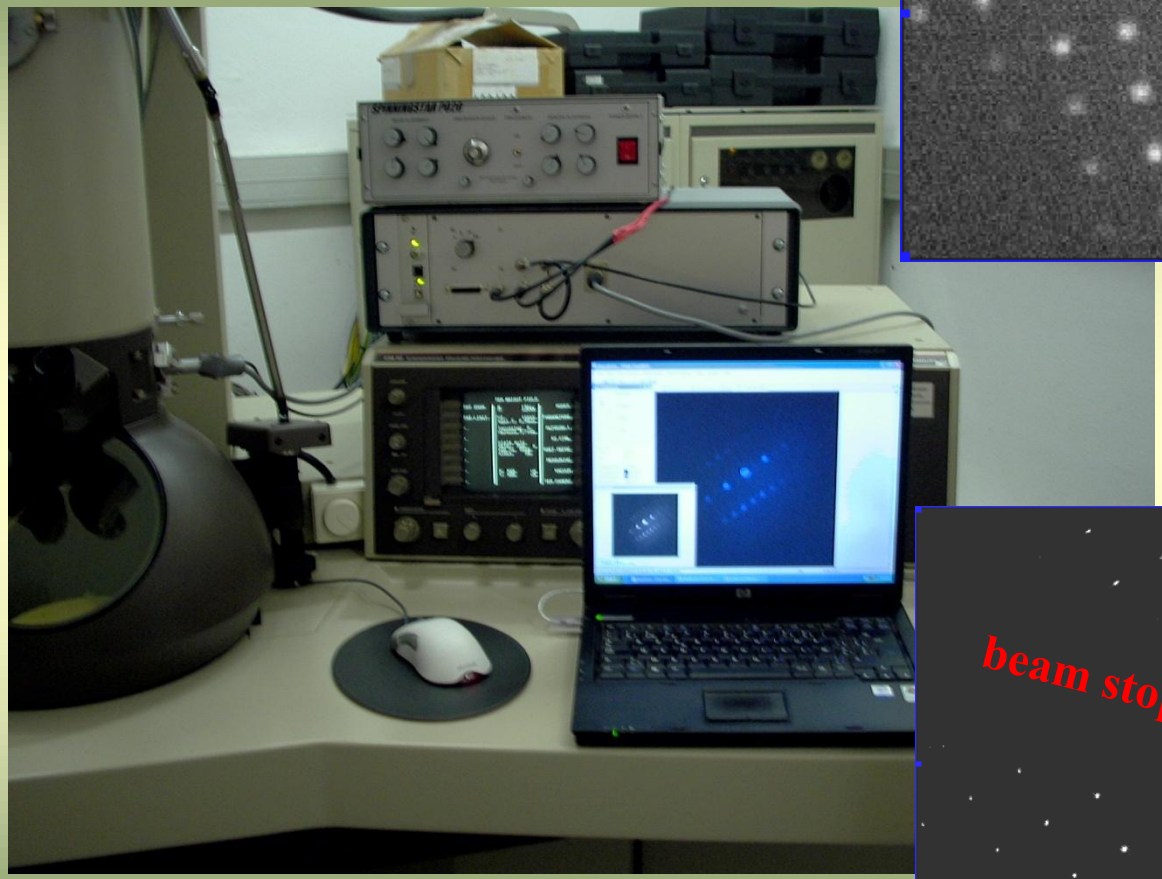
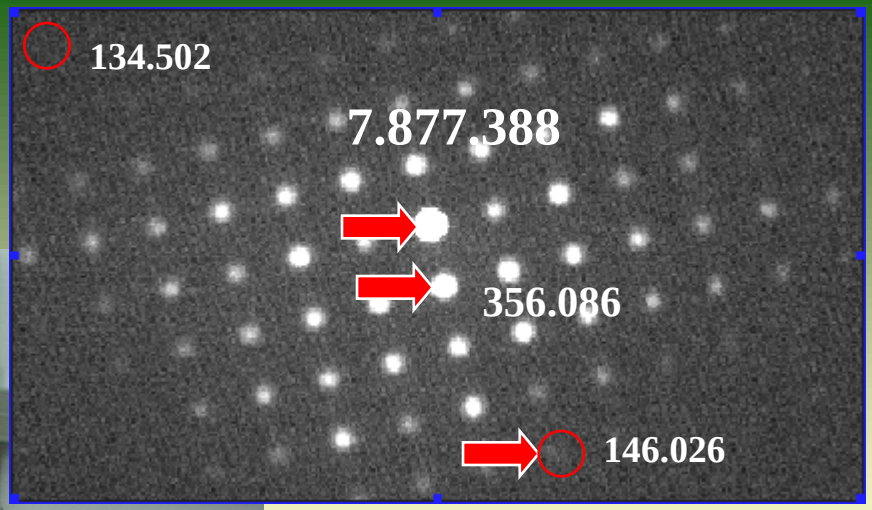
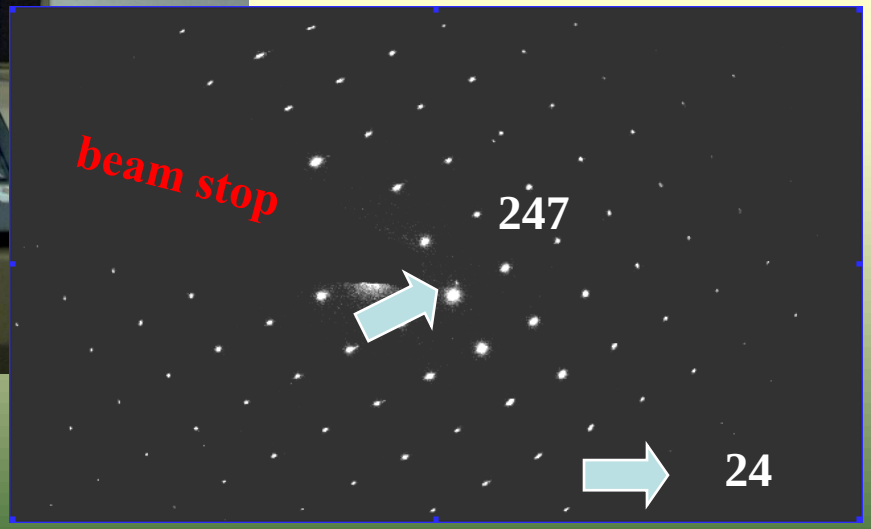
Comparison CCD – Electron difractometer





Electron difractometer 24 bit
16.000.000 grey levels

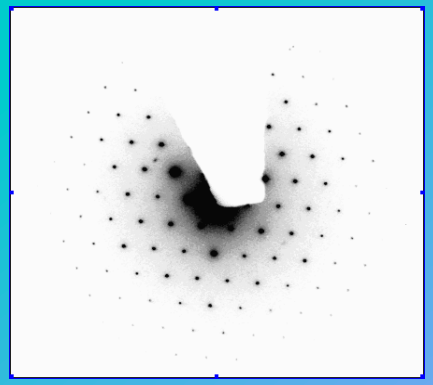


CCD 12 bit 4096 grey levels

COMPARISON CCD camera – Electron diffractometer Pleiades

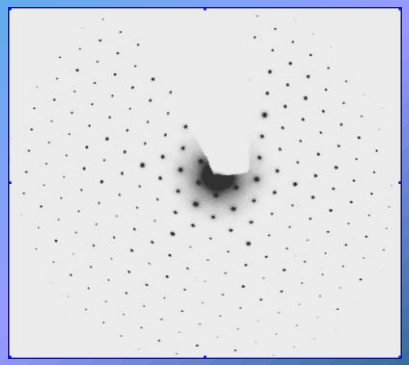
example : $Ca_{12}Al_{14}O_{33}$ [1 1 1] mayenite cubic garnet a=1.198 nm

12 bit (4096 grey levels) CCD camera ----- 24 bit (16.000.000 grey levels) electron diffractometer



Rmerge
kinemat -SAED = 54 %

Rmerge,internal = 34.8%

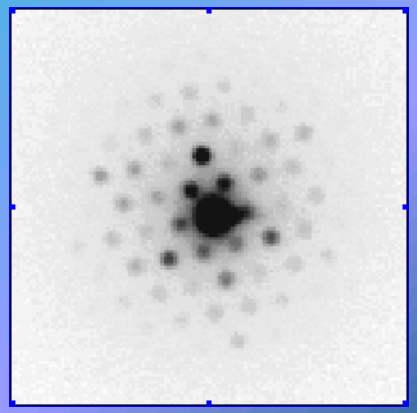


Rmerge
kinemat-precession = 29.5%

Rmerge internal = 23.9%

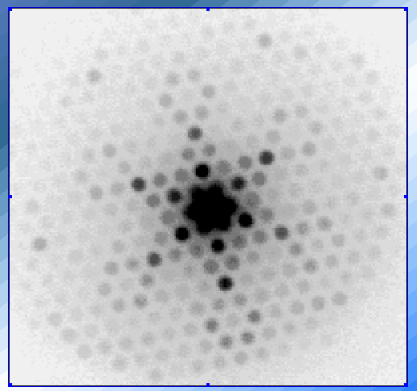
NO Precession

Precession



Rmerge
kinemat -SAED = 44%

Rmerge,internal = 32.3%



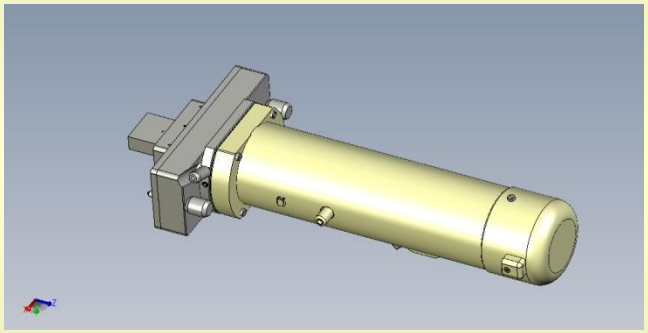
Rmerge
kinemat-preces = 21%

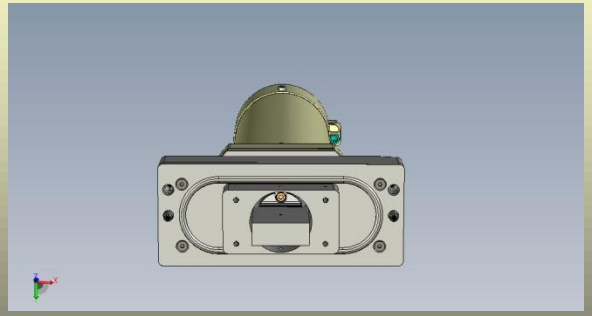
Rmerge,internal = 14.7%

Modular design 35 mm port DETECTOR housing

by Fischione Inc

compatible with 35 mm port HAADF detector FEI , Jeol …





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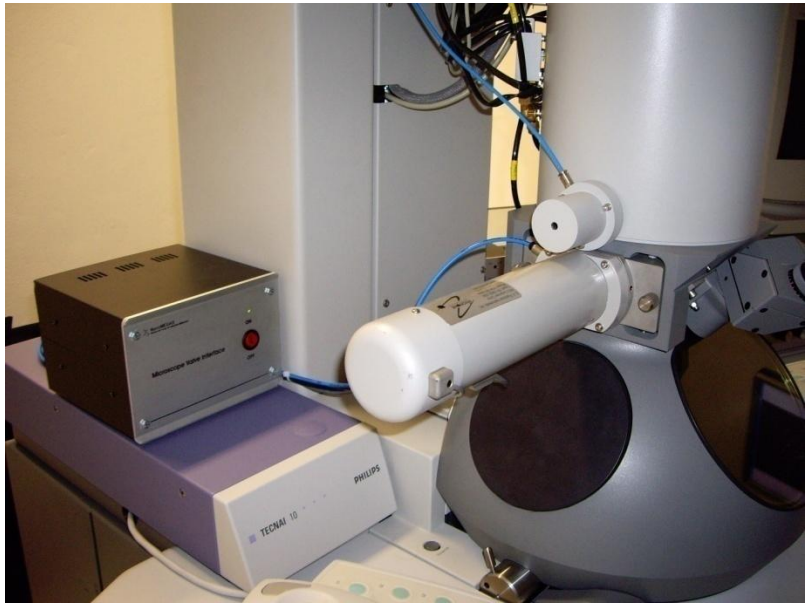
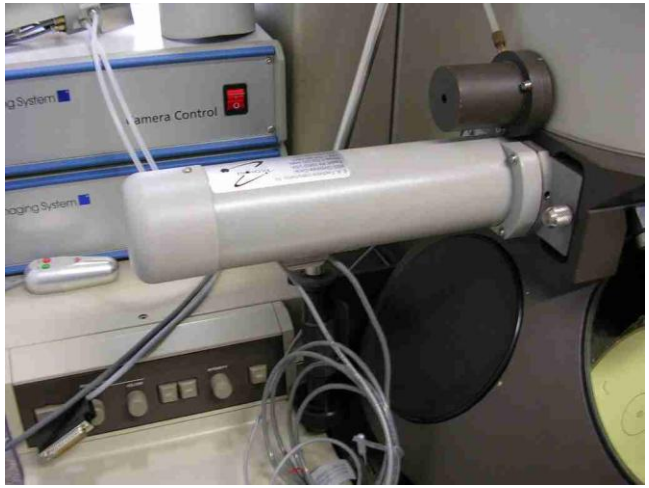
FISCHIONE INSTRUMENTS

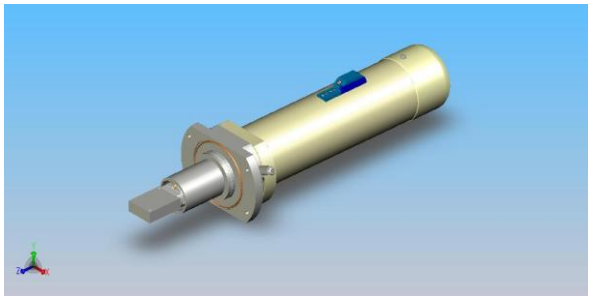


« Spinning Star » + Electron diffractometer + Fischione inteface installed at

EM400, CM12, Tecnai 10

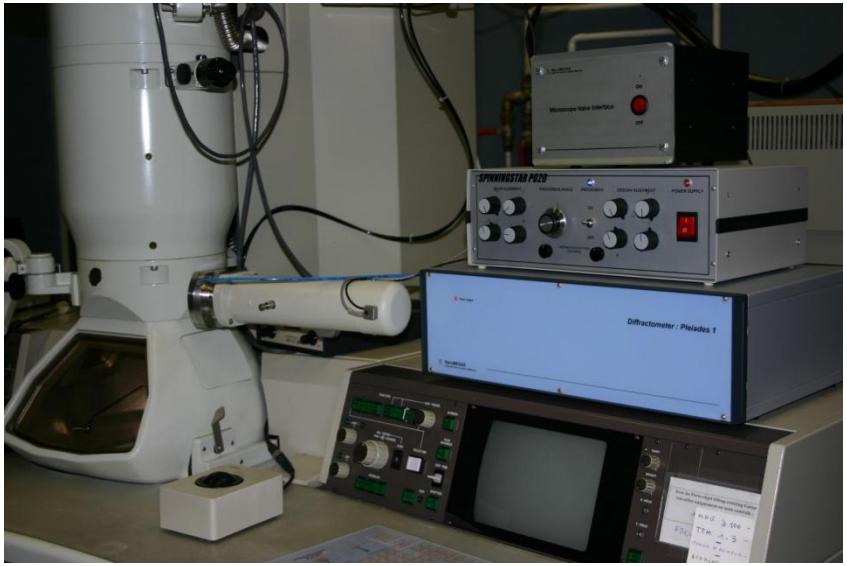


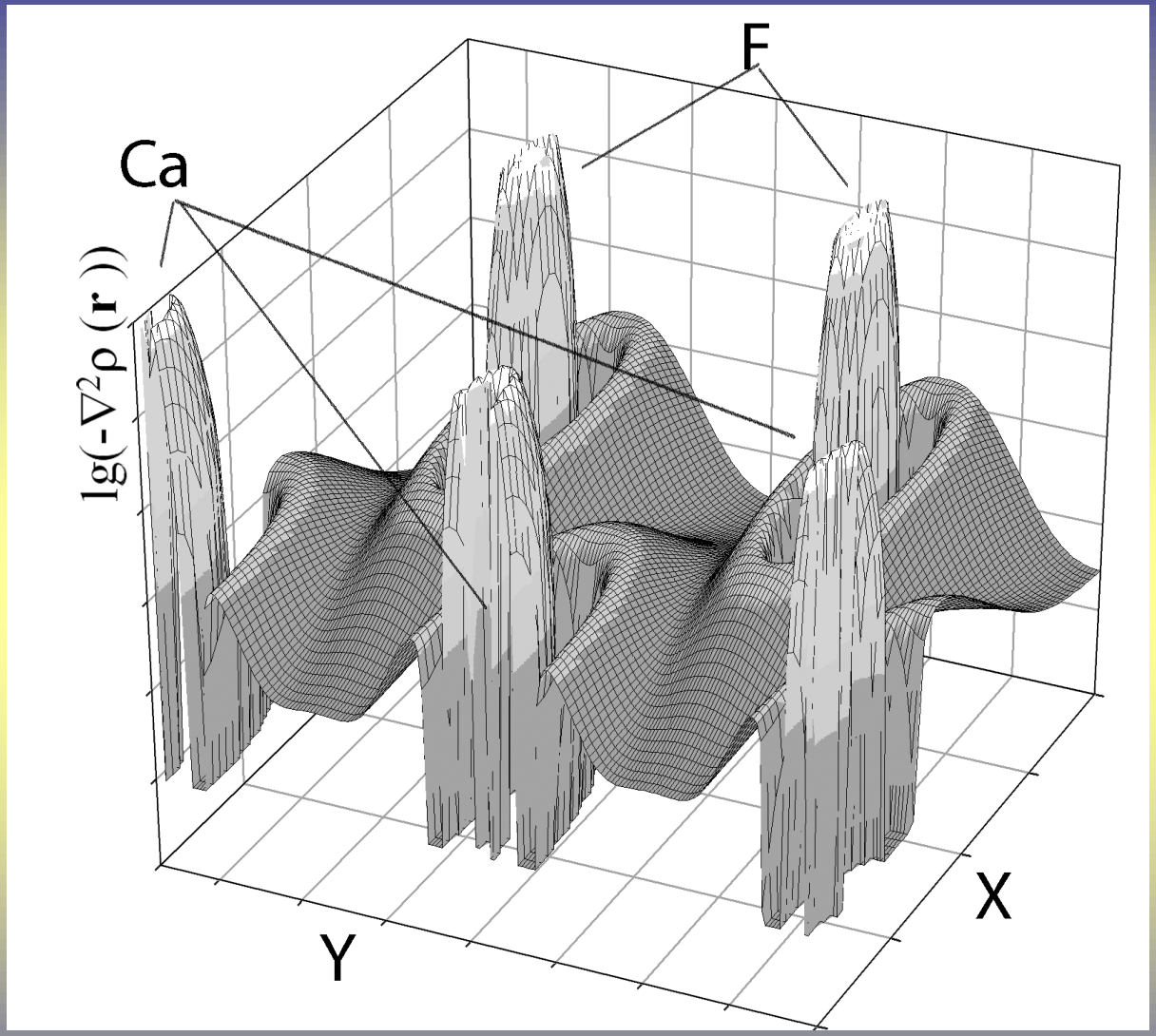
small box with on/off switch to insert Megaview CCD camera



« Spinning Star » + Electron diffractometer
+ Fischione inteface installed at

JEOL 2100, JEOL 2010 , JEOL 2000

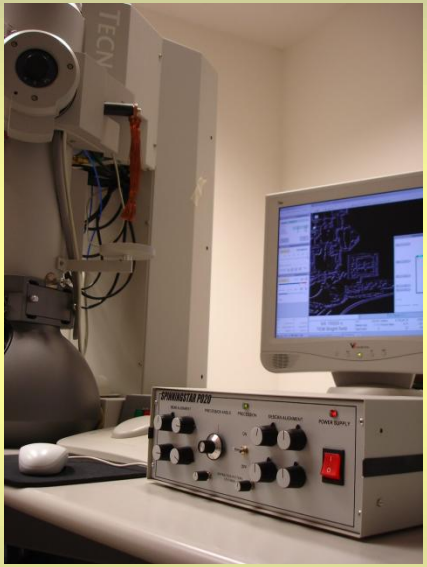




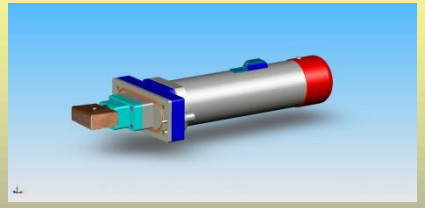
Laplacian electron density distribution -∇2ρ(r) along (110) plane of CaF_2

NEW tools for your TEM…

TEM



PRECESSION UNIT



ELECTRON DIFFRACTOMETER

EDS

EELS

STEM

CCD

HAADF

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