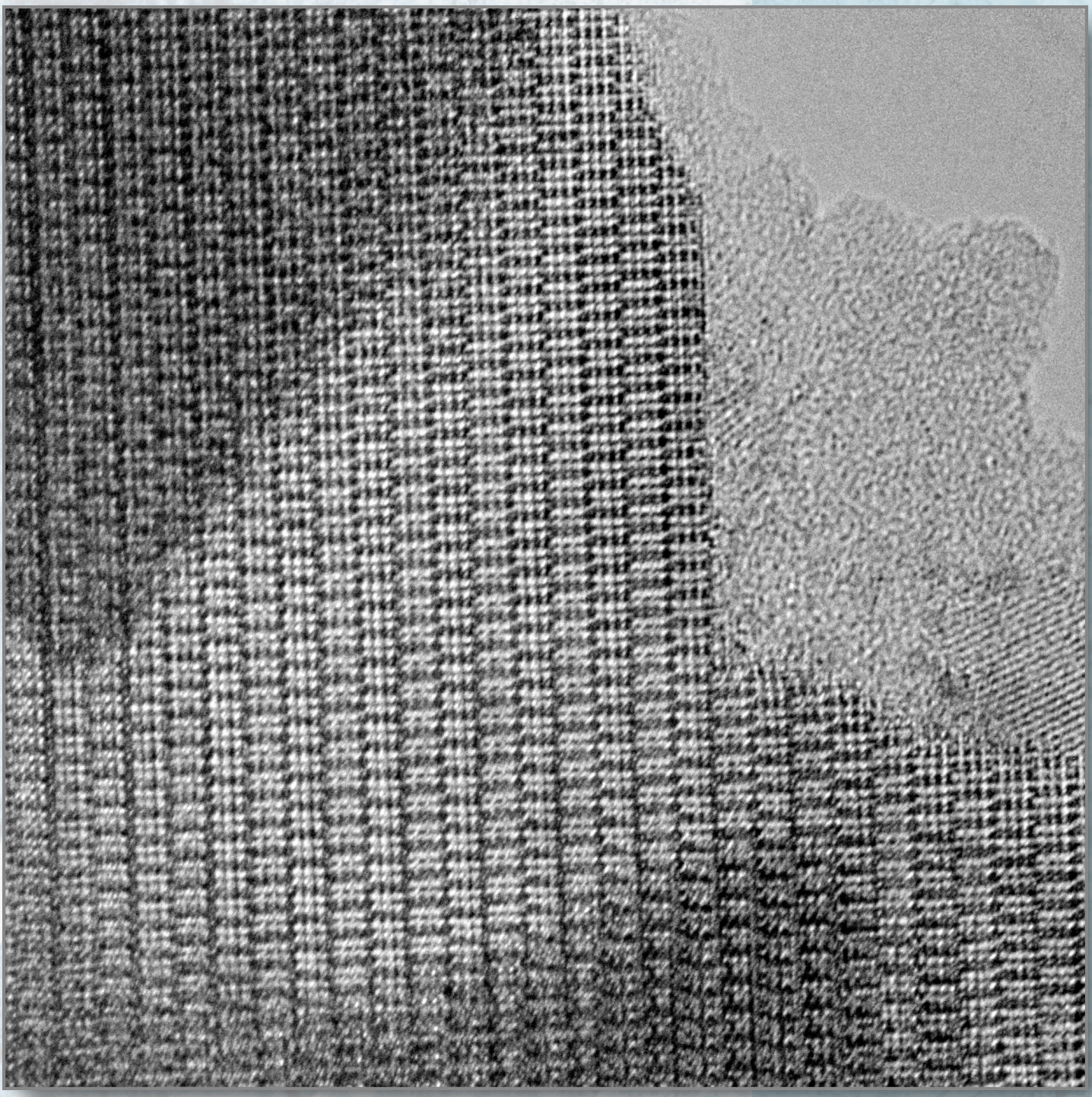
TemCam-F224HD

Slow scan CCD camera (2k, 24µm, 16bit)

TVIPS
Tietz Video and Image Processing Systems

TemCam-F224HD is a further development of the very successful TemCam-F224. A new electronic design utilizes the excellent dynamic range of the 2k 24 µm pixel scientific-grade CCD chip with guaranteed performance, achieving a dynamic range of more than 25000:1. TemCam-F224HD is the perfect replacement for film in the TEM lab. Outstanding in resolution, sensitivity, and dynamic range, it is the ideal camera for all kinds of applications, including low dose imaging and diffraction.

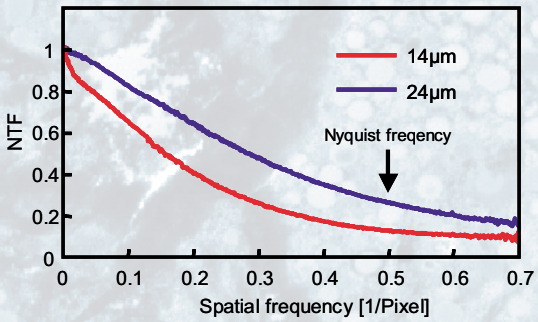
TemCam-F224HD



High-resolution image of $Ti_2Nb_{10}O_{29}$, image size 2048^2 pixels (D. Smith, ASU Arizona, and H. Lichte, TU Dresden)

Large pixel size

The active pixel area of a 24 µm pixel is 2.9x larger than a 14 µm pixel resulting in a higher full well capacity of the CCD chip and hence extending the dynamic range. Also, the resolution of a 24 µm pixel camera is improved in comparison to a 14 µm pixel camera with the same number of pixels.



Noise transfer function (NTF) of 2k cameras with 14 µm and 24 µm pixel (corrected for aliasing)

Fiber optical coupling

Fiber optical coupling of the electron-sensitive layer (scintillator) with the CCD sensor increases the amount of light collected in comparison with lens-optical coupling and, as a result, the sensitivity of the camera.

Optimized scintillators

TVIPS optimizes the scintillator for individual demands. Resolution and sensitivity can be customized for high tensions from 100 to 400 kV. Two standard types are available: optimized for high resolution (HR) or for high sensitivity (HS).

Near axis flange

TVIPS has designed a special flange which combines TemCam-F224HD with FastScan-F114NX, a high quality fiber-optically coupled CCD camera operating at video rate. In consideration of the disadvantages of side-mounted cameras this is an interesting option to monitor the TEM image and its FFT in real-time, for the purpose of alignment, demonstration or low dose search.

Specifications

CCD type (architecture):	Full frame (100% fill factor)
CCD format:	2048 x 2048 pixels
CCD pixel size:	24 x 24 µm²
Field of view:	49.2 x 49.2 mm²
Readout rate @ digitization:	1 Mpixel/sec @ 16 bit
Frame rate at full resolution:	0.2 frames/sec
TEM column interface:	Bottom-mounted (on-axis), rotatable
Post-magnification:	1.4x – 2.0x
Electron-optical coupling:	Fiber optics (1:1)
Scintillator type:	Polycrystalline phosphor, type HR or HS
CCD cooling:	-30°C @ 18°C water (2 l/min), regulated
CCD binning factors:	1x - 8x
Subarea readout:	Any rectangular area
Gain factors (analog):	1x, 2x, 4x
Full well capacity:	570 000 CCD e^-
CCD noise (RMS) :	22 CCD e^-
Dynamic range:	25 000:1 (maximum/noise), 65 536 grey values
Non-linearity:	< 2%
Conversion rate:	20 CCD e^-/ADU (gain 1x), 5 CCD e^-/ADU (gain 4x)
Sensitivity (120 kV):	typ. 60 ADUs per primary electron (HS scintillator, gain 4x)
SNR (for a single 120keV electron):	12
Resolution (NTF at Nyquist freq.):	> 20%
Anti-blooming:	Yes
Image processing system:	Windows 2000, PCI interface, EMMENU image processing software

Please consult our brochure "Digital TEM Imaging" for further technical information!

Detailed data can be found on http://www.tvips.com. Data in this brochure are typical and not binding.

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