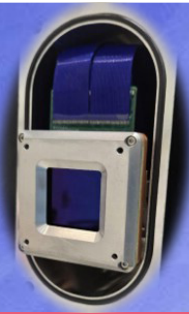




# MERIDIAN

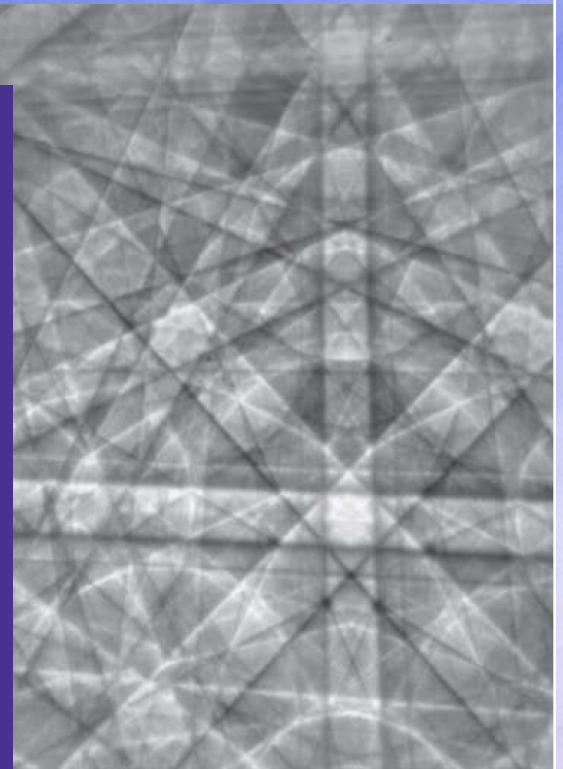
Extraordinary Resolution for HR-EBSD and TKD



Delivering Bigger | Better | Faster | Cameras For Electron Microscopy

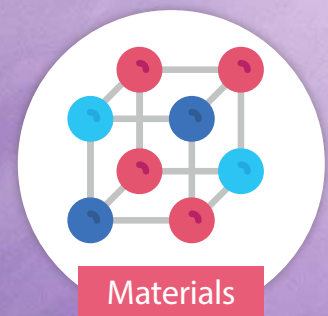
## DIRECT DETECTION FOR ELECTRON BACKSCATTER DIFFRACTION

- Stunning sensitivity at 5kV and 10 kV for beam sensitive samples.
- $2k \times 2k$  (4.2 million) pixels at 281 fps.
- Fine features resolved in sharp detail for unmatched HR-EBSD results.
- **New mechanical design** places sensor in a traditional EBSD detector geometry.
- Live Hough indexing and pattern sharpness maps through DE Mission Control software.
- Open software to easily integrate with many versions of indexing software.
- Integrated with CrossCourt4 for HR-EBSD analysis.
- Compressive sensing mode detection enables 6000 pps imaging over the full area of the sensor.
- Detect strain differences of 1 in 10,000.
- Low energy HR-EBSD pushes spatial resolution to  $<20\text{nm}$  step size.
- Automated tilting to TKD mode.
- Integrating mode weights electrons by energy, optimizing image quality.
- Electron counting provides energy filtering capability.
- Adjustable sensor threshold.
- The largest impact hardware upgrade you can make per dollar.



Kikuchi pattern of single crystal silicon with DE Meridian at 12 kV. 255 fps 1 second exposure with 4 nA beam current.  
*Courtesy of Dan Gianola, (University of California, Santa Barbara, USA).*

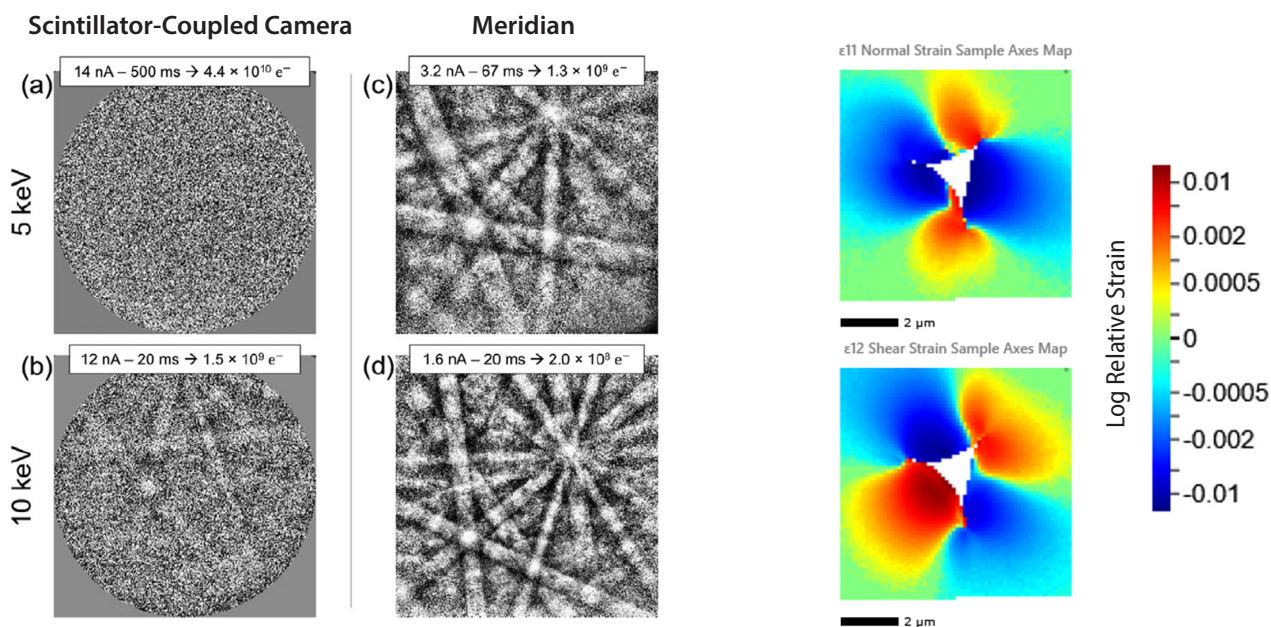
## DETECTOR APPLICATIONS:



**Direct Electron**  
INNOVATION PROPELLING DISCOVERY®

directelectron.com • sales@directelectron.com • (858) 384-0291

|                                  |                                                                                                                                                                                                                                   |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Electron Energy</b>           | Sensitive for 3 - 40 kV (optimized for 8-20 kV)                                                                                                                                                                                   |
| <b>Pixel Array Specification</b> | 2048 × 2048 (4.2 million pixels)   13 μm pixel pitch                                                                                                                                                                              |
| <b>Single Electron SNR</b>       | ~50:1 (15 kV)                                                                                                                                                                                                                     |
| <b>Sensor Design</b>             | >3T pixel design with on-chip correlated double sampling (CDS)<br>backthinned   radiation hardened                                                                                                                                |
| <b>Acquisition Frame Rate</b>    | 281fps max, full-frame   subarray readout up to 4,237 fps (2048 × 128)<br>compressive sensing readout enables >6000 fps over full sensor area                                                                                     |
| <b>Mounting Position</b>         | EBSD port mount   extend/retract motion   automated tilting to TKD mode<br>high-performance computer   Windows 11   Nvidia GPU(s)   up to 58 TB storage                                                                           |
| <b>Data Format</b>               | .UP2 , .mrc, .h5EBSD                                                                                                                                                                                                              |
| <b>Acquisition Software</b>      | DE Mission Control software for advanced data acquisition   Integrated scan control   Live Hough indexing and pattern sharpness maps to see Orientation and GNDs   Compatible with Cross-Court4 for HR-EBSD strain-map generation |



Left: Comparison of low energy sensitivity on Meridian with traditional indirect detectors. (a), (c) EBSD pattern of Hafnia at 5kV, the pattern on Meridian has 33 times less dose. (b),(d) EBSD pattern of Hafnia at 10kV, the pattern on Meridian has 7.5 times less dose but still produces a much better image. Right: HR-EBSD strain maps of a silicon indent at 12kV. Yellow represents ~0.02% strain.

*Data is courtesy of Gianola group, UC Santa Barbara and processed using CrossCourt Rapide.*