A blue circular graphic containing the text "High definition" in white, bold, sans-serif font.

## ***eFlash*<sup>HR</sup> – High resolution EBSD detector**

The ***eFlash*<sup>HR</sup>** offers both high resolution and sensitivity. With a native resolution of almost 2 Megapixels (1600 x 1200 pixels) and state of the art camera optics for minimized distortions ***eFlash*<sup>HR</sup>** can acquire high definition Kikuchi patterns that display very fine details making it the perfect choice for residual strain analysis. When used in 20x20 binning mode it can acquire up to 170 patterns/s. Its excellent sensitivity makes EBSD measurements possible even at probe currents as low as 0.5 nA. All these properties make the ***eFlash*<sup>HR</sup>** the best solution when dealing with complex EBSD analysis cases.

The list of suitable applications includes:

- low beam current operation
- low kV operation
- poorly conducting samples
- nanomaterials (Transmission Kikuchi Diffraction - TKD)
- analysis of pseudo-symmetries
- lattice strain investigation

The ***eFlash*<sup>HR</sup>** detector has a unique in-situ tilt capability which allows the user to shift the fluorescent screen vertically, enabling a very large working distance (WD) range, so that every measurement is made at optimum pattern center values and best diffraction signal distribution. The detector tilt angle is electronically read and automatically included in the pattern center calibration algorithm.

ARGUST<sup>™</sup>, Bruker's imaging system consisting of two BSE and three FSE detectors arranged above and below the screen, is also available for ***eFlash*<sup>HR</sup>**. The BSE detector delivers density contrast images while the FSE imaging system generates color-coded orientation contrast images with unmatched sensitivity for small orientation changes.

The ***eFlash*<sup>HR</sup>** also features a motorized high precision guiding system (better than 0.01 mm) for accurate repetitive positioning of the detector between measurements. The software controlled insertion/retraction can be done at speeds of up to 10 mm/s and for distances of up to 250 mm making it compatible with SEM chambers of all sizes.

The detector is equipped with a LED indicator showing the current screen position, and a touch sensor/alarm. Should it be necessary, the phosphor screen as well as the FSE/BSE diodes can be easily exchanged by the user.

The detector head of the ***eFlash*<sup>HR</sup>** has a slim and tapered design to enable working at small WDs (TKD mode) as well as short detector-to-sample distances. The ***eFlash*<sup>HR</sup>** has been designed to be used in combination with the XFlash<sup>®</sup> EDS detectors. All EBSD detector and BSE/FSE imaging system electronics as well as all moving parts are housed inside the detector case.

## Technical Specifications

Native resolution 1600 x 1200 pixels

Pixel binning and speed native res.: 35 patterns/s, 2 x 2: 55 patterns/s, 4 x 4, 5 x 5, 10 x 10: 140 patterns/s, 16 x 16: 150 patterns/s, 20 x 20: 170 patterns/s

High end 12 bit digital CCD camera

34 x 25.5 mm phosphor screen, user replaceable

High vacuum compatible detector with welded bellows, all electronics and moving parts integrated in case

Detector in-situ tiltable by max.  $\pm 4.5$  degrees

Motorized insertion mechanism, maximum speed 10 mm/s, positioning accuracy better than 0.01 mm, maximum insertion distance of 250 mm, software or manual control through a push button panel on both detector sides

LED position indicator

Safety mechanism with audio and visual alarm and auto-retract function

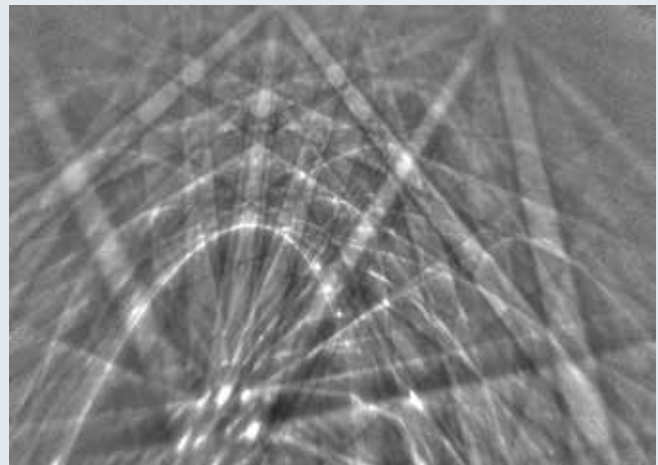
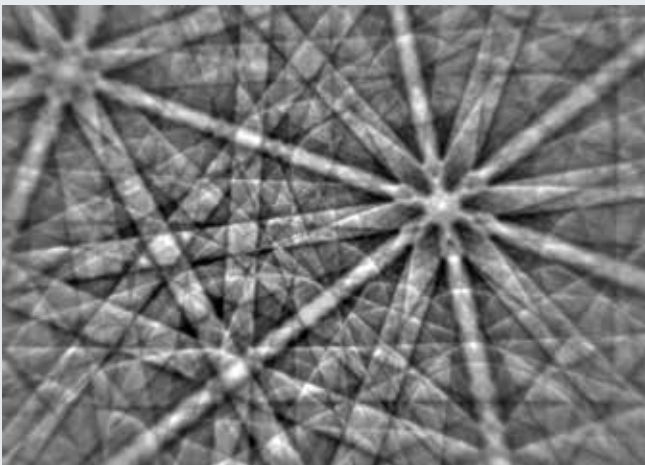
Tapered detector nose to provide optimum conditions for simultaneous acquisition of EDS and EBSD data

Digital Gigabit Ethernet output (no frame grabber required)

Adaptable to most SEMs, minimum port diameter of 48 mm required

Option: BSE/FSE imaging system with 2 BSE diodes above the screen and 3 FSE diodes below the screen (**eFlash<sup>HR+</sup>**); existing **eFlash<sup>HR</sup>** detectors are upgradable at the customer's site

## High resolution pattern images with the eFlash<sup>HR</sup>



Left: High resolution Kikuchi pattern of (BCC) steel acquired in EBSD geometry.

Right: High resolution Kikuchi pattern of SiC acquired in TKD geometry. Both patterns were saved in TIFF 16bit format (4096 gray levels).

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