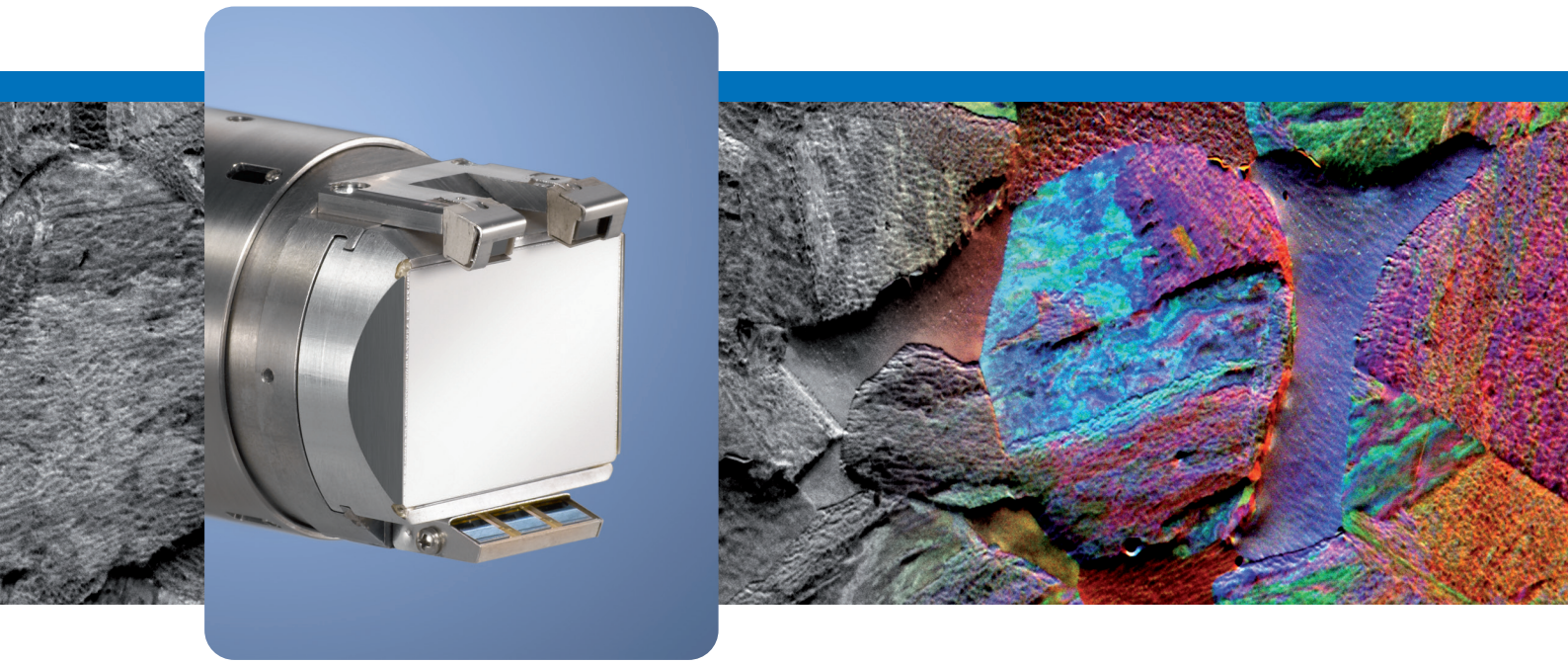


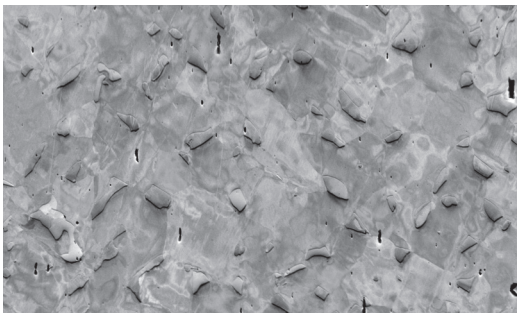
ARGUS™ FSE/BSE imaging system for the eFlash detector

Bruker's high performance eFlash EBSD detector is optionally available with the ARGUS™ forescattered (FSE)/ backscattered electron (BSE) imaging system. This further increases the versatility of the detectors and provides valuable additional information for meaningful and efficient EBSD analysis.

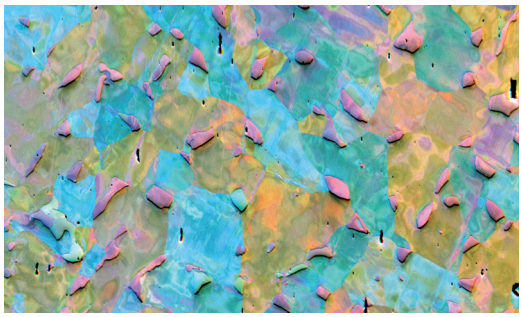
Three FSE detectors positioned below the screen are used for acquiring color coded orientation contrast images, without additional software enhancement. Two BSE detectors placed above the phosphor screen can be additionally used to acquire phase contrast images.

All electronics required for the operation of the FSE/BSE detectors are placed inside in the eFlash detector casing. Apart from the convenience this also ensures that signal loss is minimized as the preamplifiers are very close to the detectors. ARGUS™ is fully integrated with QUANTAX EBSD and adopts its user-friendliness. Signal optimization is automatic, but if necessary, the signal mixing and optimization can be done manually.

The FSE/BSE detectors are user replaceable. This is not only advantageous in case of repairs, but a very useful feature for avoiding damage under extreme environmental conditions, e.g. in-situ heat treatment experiments.



Grayscale FSE image of a polished section of the Cape York iron meteorite, similar to what can be obtained with common FSE detectors.



Color coded image produced by mixing the signals of the Bruker FSE detectors, showing microstructural details invisible in the grayscale image.

BSE detectors for improved image quality

In EBSD sample setup mode the standard SEM SE and BSE detection systems tend to produce low quality noisy images. Bruker's BSE detectors are optimally positioned to acquire the BSE signal from samples with a high tilt angle, as is the case for EBSD measurements. This includes the location above the screen and the inclination towards the sample, both of which ensure optimum signal strength. The two BSE detectors are specially designed to allow inserting the EDS detector very close to the sample thus increasing its solid angle and making simultaneous EBSD/EDS data acquisition possible at extremely high speeds.

The phase density contrast signal acquired by the BSE detectors can be used individually or mixed with the FSE signal.

Colored SEM images using Bruker's FSE detectors

Each one of the three FSE detectors positioned below the phosphor screen captures a different part of the diffraction signal as this signal is highly anisotropic and dependent on crystallite orientation.

By controlling each detector separately and using the RGB code to mix the three signals the ARGUS™ FSE imaging system produces color coded images with unparalleled sensitivity to the smallest orientation change.

The in-situ tilting feature of eFlash detectors can also be used for FSE signal optimization. The FSE detectors can be repositioned without affecting the sample or beam setup.

Due to its high sensitivity the ARGUS™ FSE imaging system is the perfect choice, e.g. for detecting the very beginning of plastic deformation during in-situ tensile/compression testing. This allows the user to control the tensile stage parameters in real time. Other possible applications for the ARGUS™ FSE imaging system are:

- fast checking of the microstructural homogeneity
- efficient and easy determination of the area of interest for EBSD analysis
- checking the sample preparation quality

eFlash Specifications

- Bruker eFlash FS detector with binning capable CMOS camera: acquisition speed up to 520 fps
- Bruker eFlash FS detector with binning capable CMOS camera: patterns of 720 x 540 pixels at up to 290 fps
- In-situ vertical shift feature allowing working distance variation for optimum signal (SEM dependent)
- Highly sensitive, allows operation at low kV
- Motorized insertion mechanism, manual or software controlled
- Multiple safety features
- Adaptable to most SEMs, 48 mm minimum port diameter required

Bruker Nano Analytics
Headquarters Berlin · Germany
Phone +49 (30) 670990-0
info.bna@bruker.com

www.bruker.com/quantax-ebsd