




AMSTERDAM
SCIENTIFIC
INSTRUMENTS

A circular X-ray diffraction pattern with a central bright spot and several concentric rings of smaller spots. The rings are labeled with their respective wavelengths: 1.0Å, 1.3Å, 2Å, and 4Å. The background is dark with a reddish-brown hue.

ZERO-

NOISE

How ASi detectors achieve 0 noise and why it matters for you

@ASI

Taking an image starts with **collecting charge**, produced as a result of high-energy electrons, X-rays, or optical photons interacting in the sensor.

#NONOISEDETECTORS

@ASI

In a conventional CCD camera, all the charge collected during the exposure is integrated to measure the intensity. Although simple, this method results in noise due to the electronic fluctuations of the baseline.

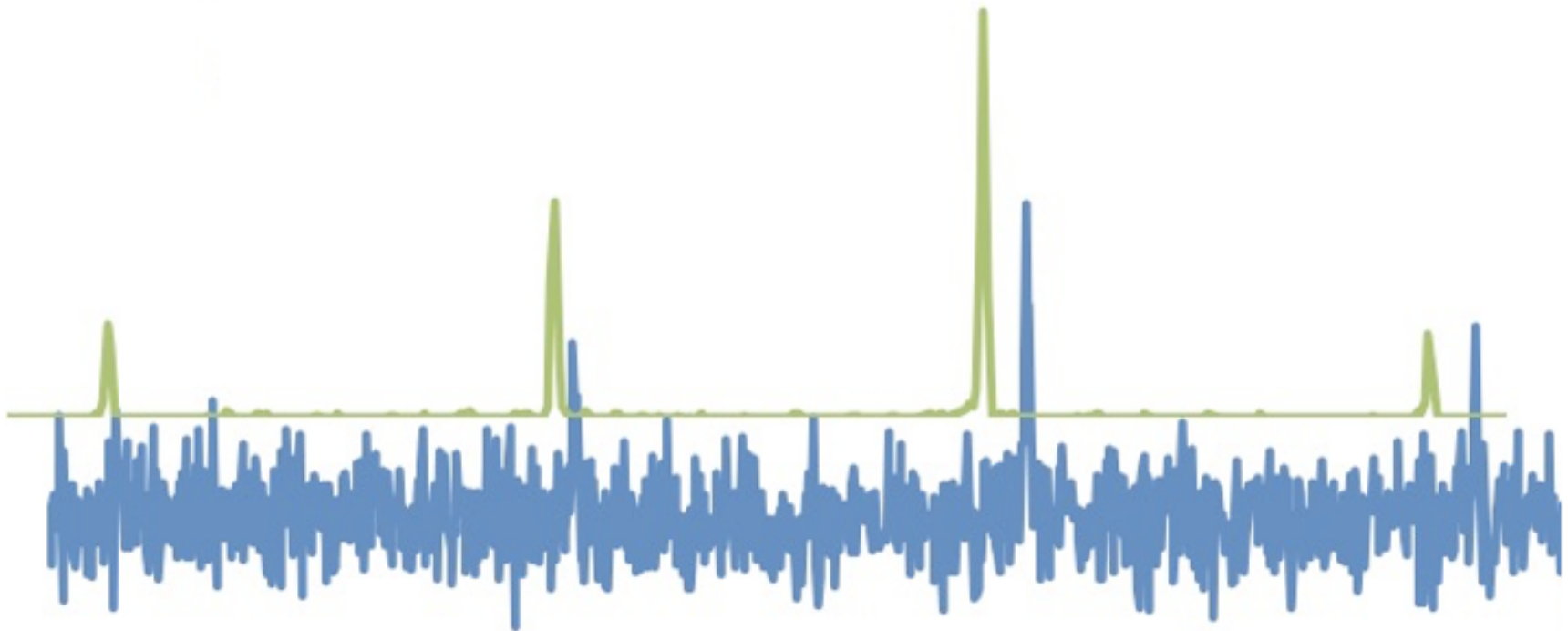
#NONOISEDETECTORS

@ASI

In ASI detectors, the electronic signal is compared with a threshold. Each individual particle is **counted directly**, rather than inferred from the integrated signal.

#NONOISEDETECTORS

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*Comparison of ASI detector technology (**green**) and conventional CCD cameras (**blue**).
ASI's pixels count the number of incoming signals (4 in this case), while CCDs sum the
signal and the baseline noise.*

#NONOISEDETECTORS

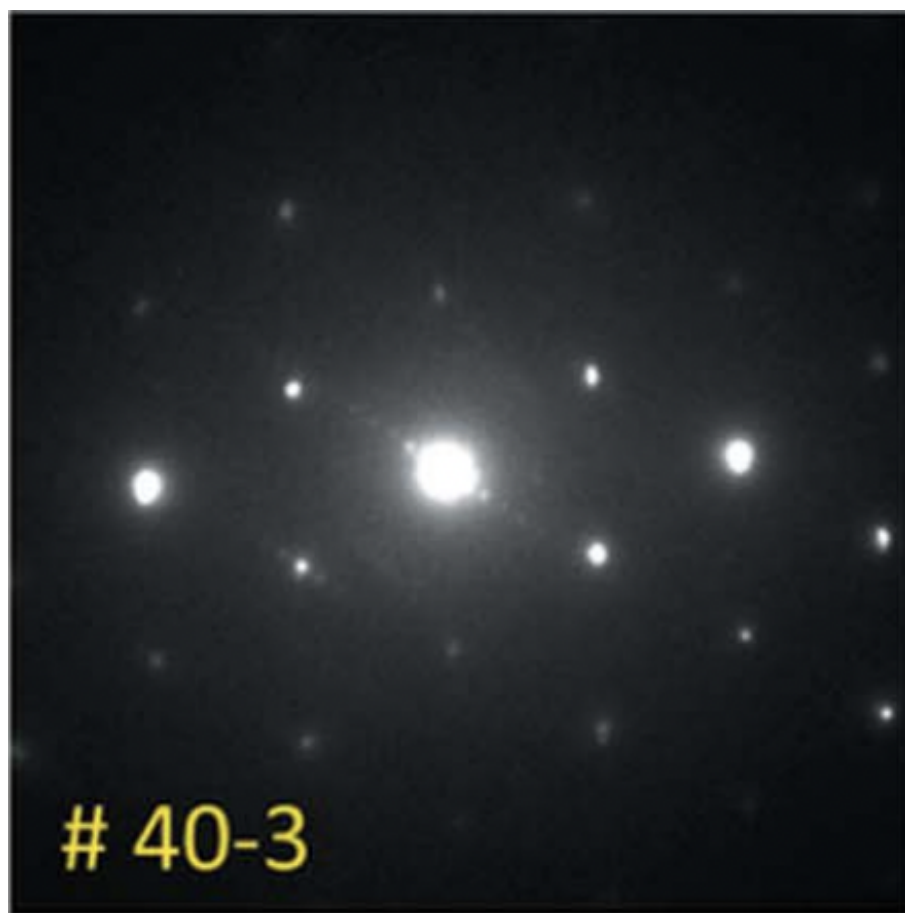
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For most applications, the **detection efficiency** is close to 100%. The combination of this detection efficiency and zero-noise ensures the best achievable signal-to-noise ratio (SNR).

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ASI's particle counting technology is ideal for **low signal** or **low dose** applications. It enables you to get the most out of your signal, with a pure zero signal for background.



Diffraction pattern for the impurity patterns found in a powder sample of Co-CAU-36.

Image courtesy of Smeets et al. (2018). Serial electron crystallography for structure determination and phase analysis of nanocrystalline materials. Journal of applied crystallography, 51(5), 1262-1273.

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Would you like to know more?

Our team at ASI are happy to help!

Send us an email:

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or visit our website:

www.amscins.com

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