



High Performance Silicon Drift Detectors

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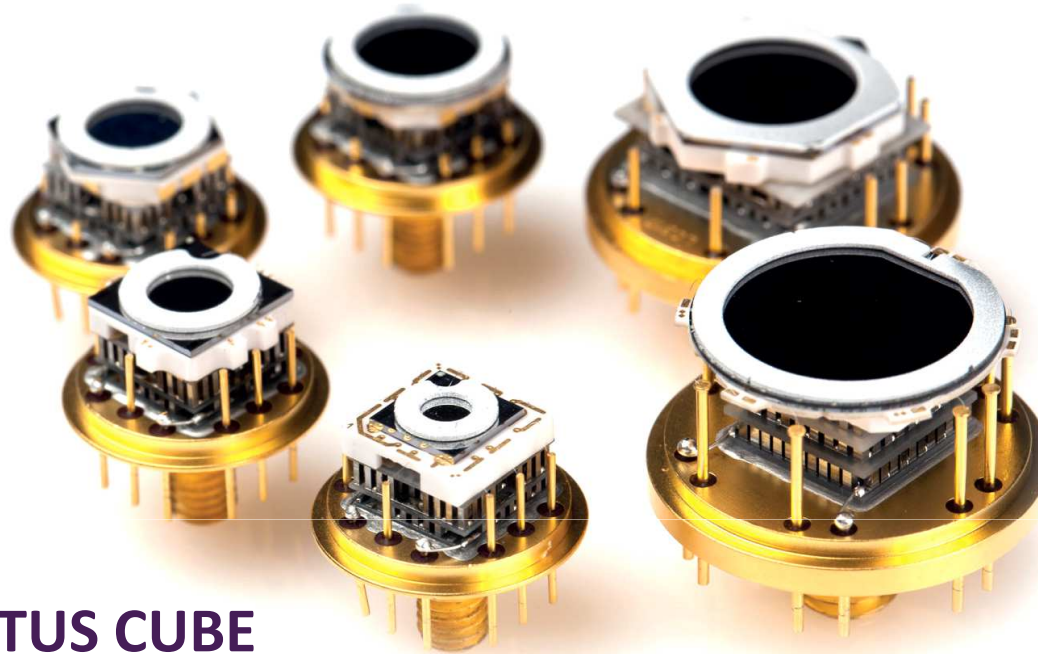
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- Low capacitance CUBE ASIC as FET replacement
- 150 mm² - world's largest SDD
- 7-channel SDD array
- Low-energy performance of KETEK SDDs
- 775 μm thick SDD
- SDD with multilayer absorber plate

The complete VITUS CUBE SDD Series

CREATIVE
DETECTOR
SOLUTIONS

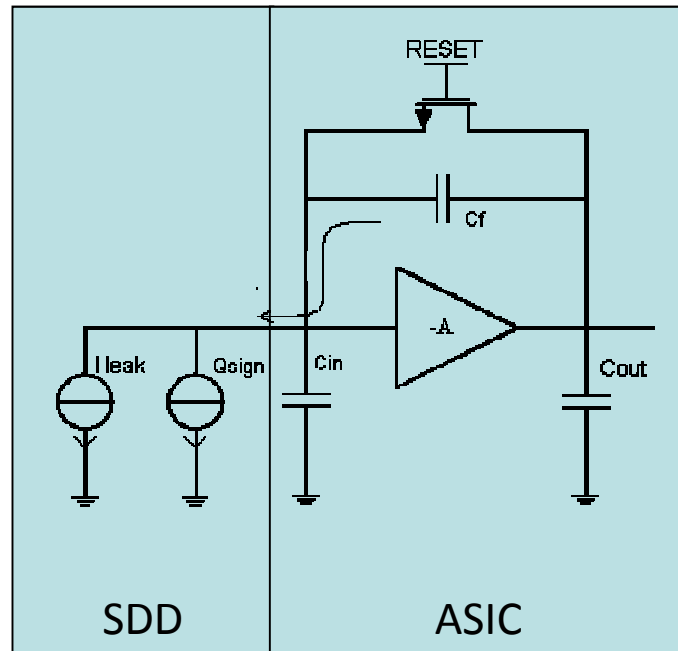


VITUS

VITUS CUBE

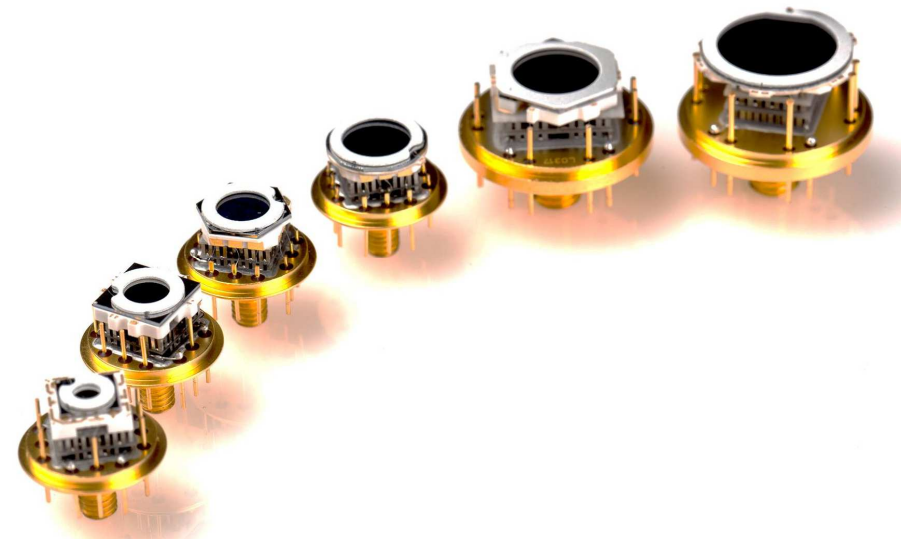
H7
H20
H30
H50
H80
H150

ASIC as FET replacement



Advantages

- Extremely low capacitance of total sensor system (approx. factor 3 lower than FET based detectors)
- Amplified signal at detector output
- High count-rate capability in combination with excellent energy resolution



New KETEK CUBE Class SDD

CREATIVE
DETECTOR
SOLUTIONS

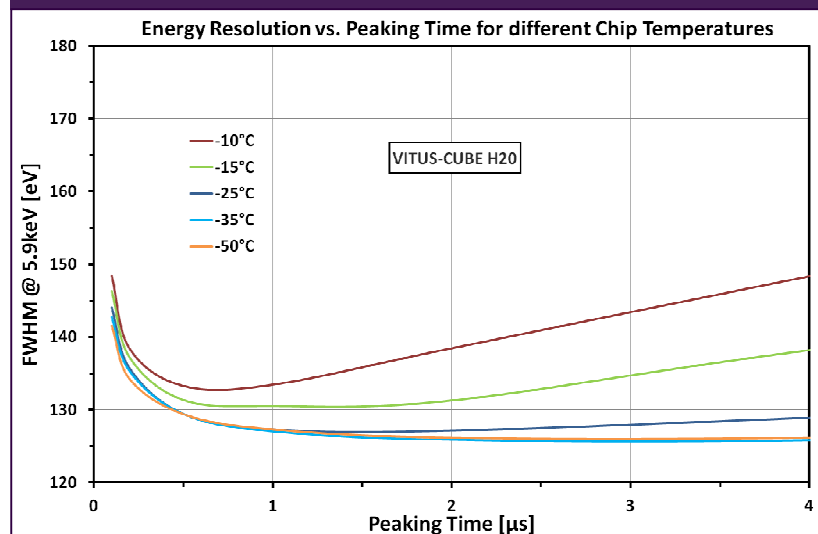


VITUS CUBE H7 – H50 in TO8 housing

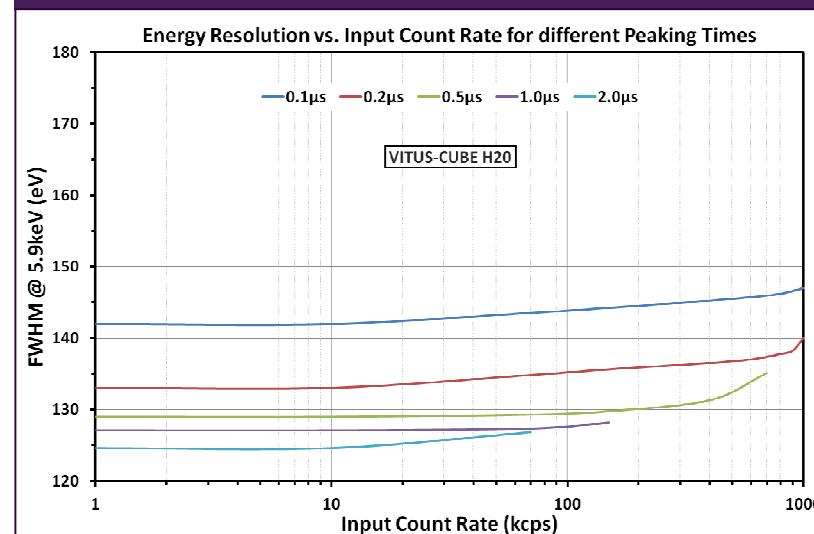
- H7: 10 mm² collimated to 7 mm² active area
H20: 30 mm² collimated to 20 mm² active area
H30: 40 mm² collimated to 30 mm² active area
H50: 65 mm² collimated to 50 mm² active area
- FWHM Mn K_α: <125 eV @ 2 μs peaking time
- High operation temperatures up to +20°C still allow resolution of 156 eV @ 0.5 μs for the 7 mm² detector



FWHM vs. peaking time for H20 SDD at different temperatures



Count rate dependency H20 SDD



New KETEK CUBE Class SDD

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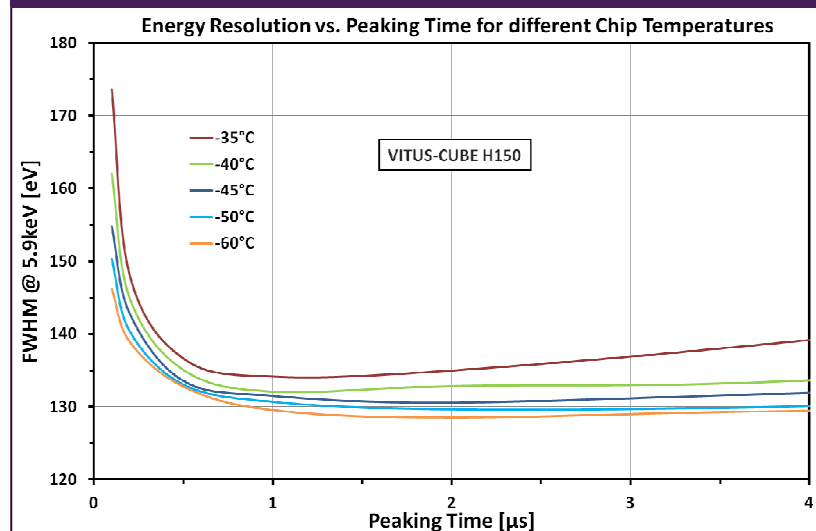
VITUS CUBE H150

- 150 mm² active, collimated chip area
- No ballistic deficit even at peaking time of 0.2 μ s
- 25 μ m Be-window
- Very large solid angle

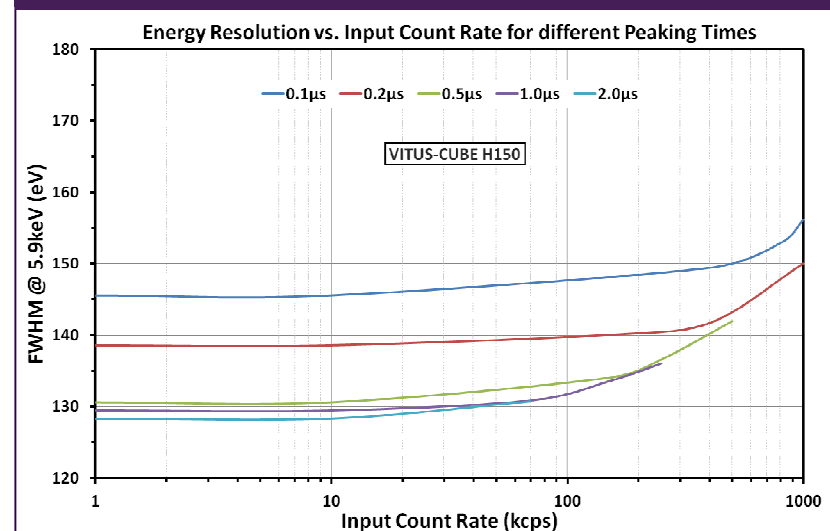


The world's
largest circular
Silicon Drift
Detector

FWHM vs. peaking time for H150 SDD at different temperatures



Count rate dependency H150 SDD



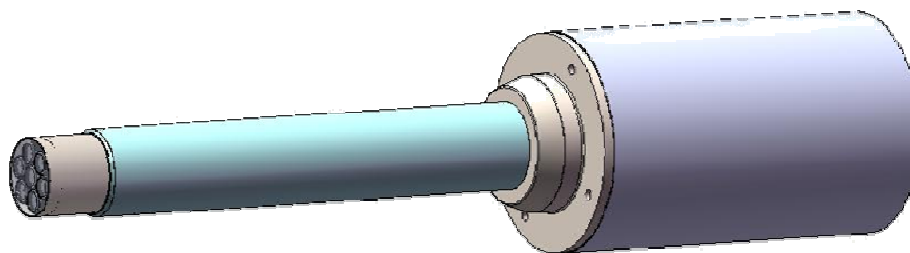
VITUS 7-channel SDD Array

CREATIVE
DETECTOR
SOLUTIONS



7x H80 SDDs in 1 Detector System

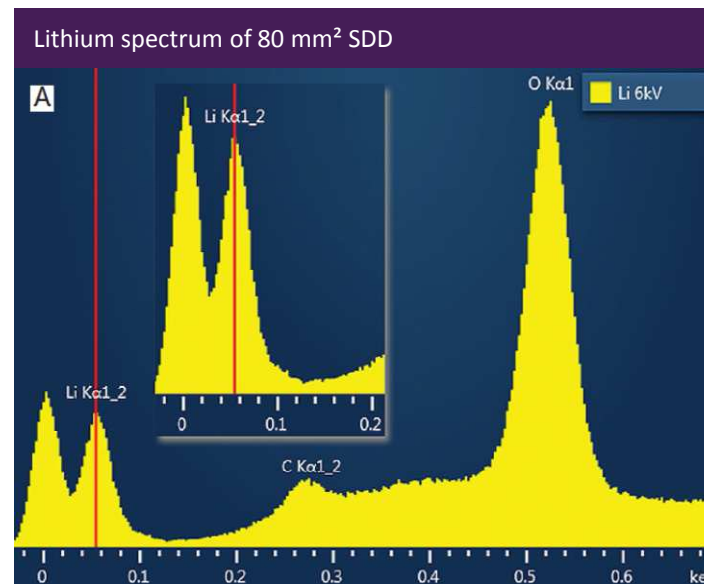
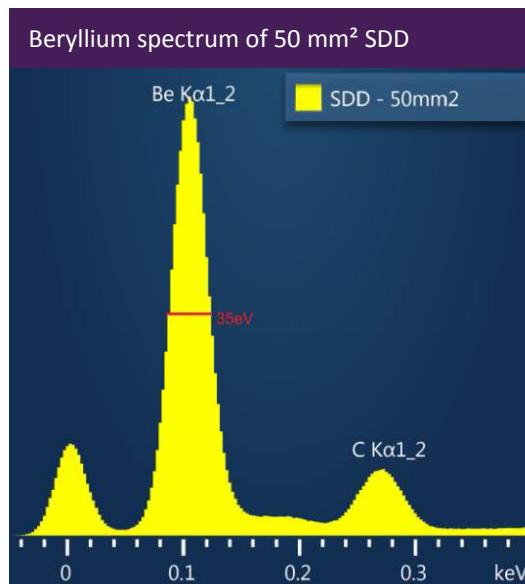
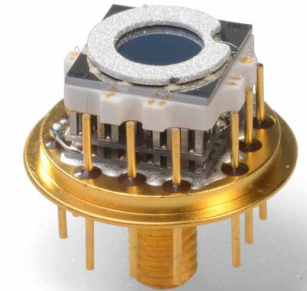
- 7 individual CUBE SDDs with Multilayer collimator
- In total 560 mm² active, collimated chip area with a large filling factor (~30%)
- FWHM Mn K_α: <140 eV @ optimal peaking time
- No active pumping
- Water cooling of heat sinks allows chip operation temperatures down to -55°C



- Outer diameter of detector head 45mm
- Finger diameter 50mm, finger length dependent on customer configuration
- Electronics completely configured

SEM/TEM applications

- Available as 7 mm² and 18 mm² modules
- Moxtek AP3.3 window
- Down to 35 eV FWHM for Beryllium K_α-line
⇒ corresponds to C-FWHM of < 40 eV
- Detection of Lithium (@ 52 eV) possible



Spectra by courtesy of Oxford Instruments NanoAnalysis

State of the
art detectors
for SEM/TEM
applications

Thick 775 μm SDD

- Standard thickness of SDDs is 450 μm
⇒ X-ray energies > 15 keV can be measured only with quantum efficiency $< 60\%$

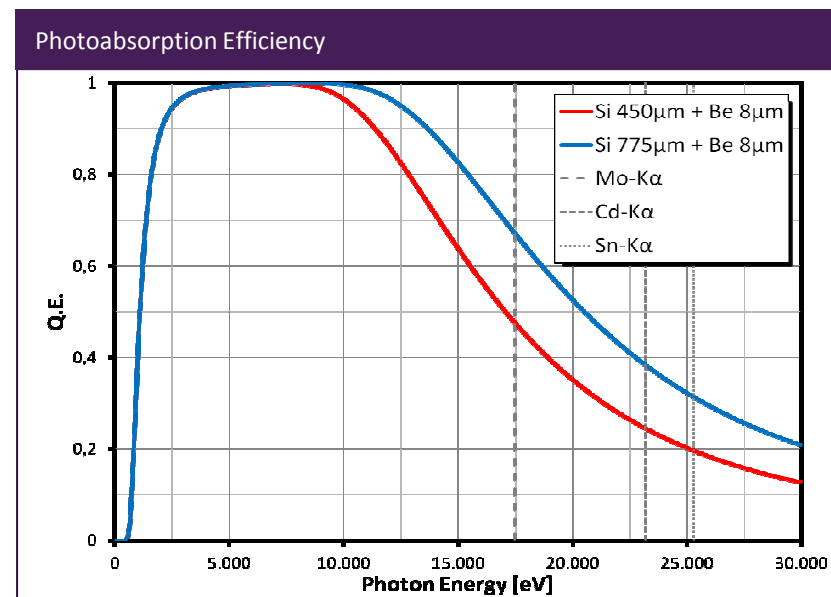
- 775 μm thick SDDs increase efficiency at higher energies

Mo → 41% higher absorption

Cd → 56% higher absorption

Sn → 59% higher absorption

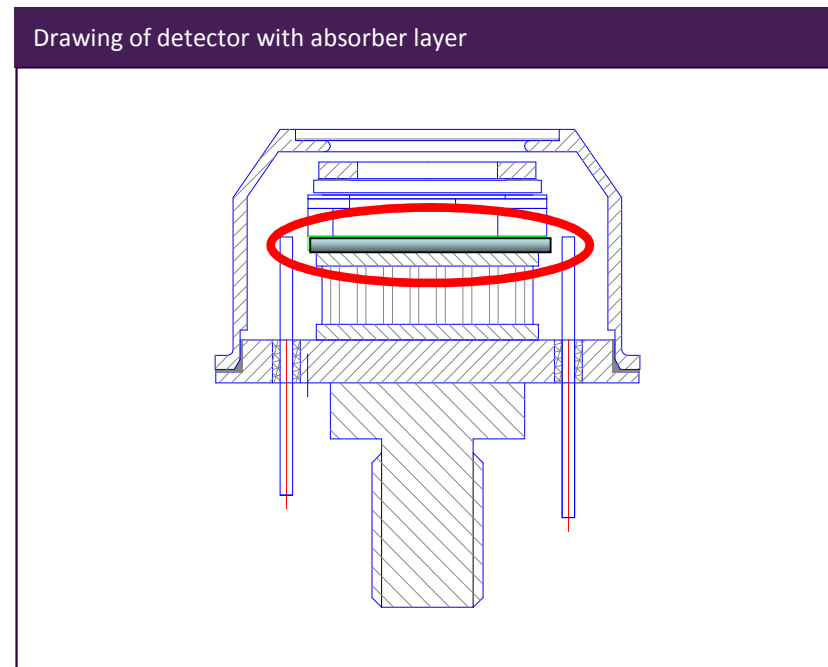
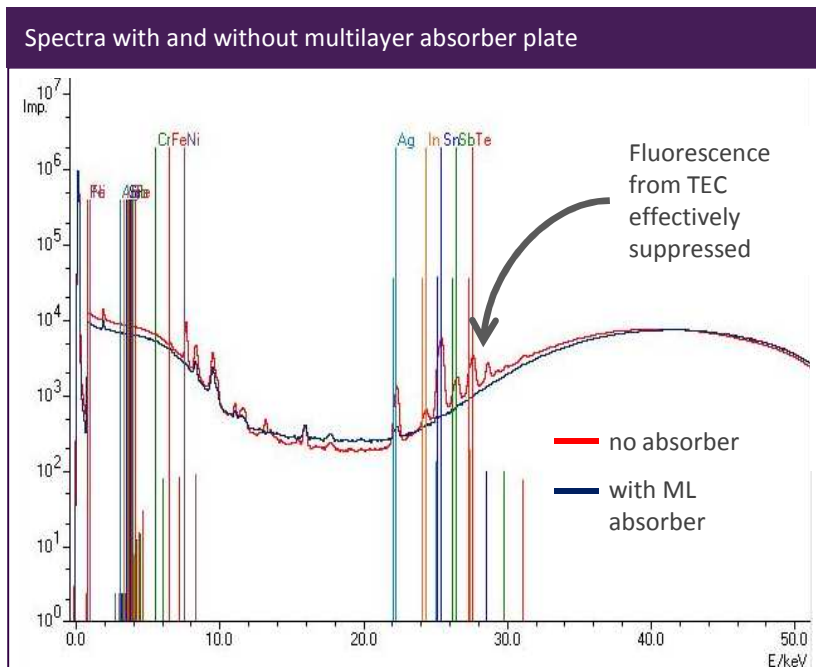
- Spectroscopic properties are equal to 450 μm SDDs



KETEK portfolio will be expanded by 775 μm thick 30 mm² SDD (H20) in 2016

Absorbing parasitic fluorescence lines

- Multilayer plate between TEC and SDD chip absorbs emitted X-rays from TEC
- Antimony (Sb), Tin (Sn), Tellurium (Te) and Indium (In) are no longer visible in spectrum
- Better limit of detection for Sb, Sn, Te and In in customer application





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YEARS
1989 - 2015
THANK
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