

PerkinElmer Products and Developments for Astrophysics

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PKI Confidential



▶ Global Technology Leader

- Mission driven: Better outcomes
- Creating a healthier, cleaner and safer environment

▶ Company Facts and Figures

- \$1.8 Billion in 2009 revenues
- 8400 employees worldwide
- Operations in 150 countries
- \$120 million in annual R&D investment
- Publicly traded (NYSE: PKI)

▶ Organized under two groups:

- Human Health
- Environmental Health

Environmental Health

Illumination & Detection Solutions - IDS

Analytical Sciences &
Lab Service - ASLS

Detection

Defense

Illumination

- On August 31, 2010, PerkinElmer announced the signing of a Definitive Agreement with Veritas Capital for the purchase of the Illumination and Detection Solutions Business.
- PerkinElmer expects the sale to be completed by the end of 2010
- **Illumination and Detection Solutions business will be an independent company with a different name.**
- IDS will **continue** to be one of the world's leading optoelectronics solutions providers in the market today with a continuing commitment to innovative, technology-based OEM solutions.



...IDS will become independent by Dec 2010

IDS Detection--- Overview

Highlights

- 7 global manufacturing and R&D sites, USA, Canada, Asia, EU
- Largest supplier of thermopile infrared sensors
- Innovative product offering such as smart digital pyroelectric sensors
- Leader in low light level detection (L³D) and infrared sensing

Product Lines

Photon Detection

- Avalanche Photodiodes
- Photodiodes & Arrays
- Channel Photomultipliers
- Single Photon Counting Modules
- CCDs
- Photocells

Infrared Sensing

- Thermopiles
- Pyroelectric Sensors



Safety and Security

- Intrusion Alarm
- Smoke Detection
- X-Ray Security Inspection



Energy Conservation

- Proximity Light Switching
- Presence Detection
- Dusk-to Dawn Light Switching



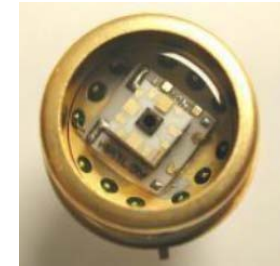
Human Health

- Molecular Imaging
- Infrared Thermometry
- Fluorescence & Luminescence



Leader in L³D and discrete IR with high volume capabilities

- Wide portfolio of opto-solutions (detectors: from UV to IR; emitters) single elements, arrays, modules...
- For low light level detection:
 - LLAM (Low Light Amplifier Module)
Various detectors with hybrid amplifier for optimum NEP.
 - SPCM (Single Photon Counting Module)
Uses Slik™ APD on double stage TEC
 - World's best performances (500nm to 1060nm)
Dark count selection from <math><20\text{cps}</math> to <math><500\text{cps}</math> at -10°C
Maximum counting rate ~30MHz
Single photon detection probability ~70%

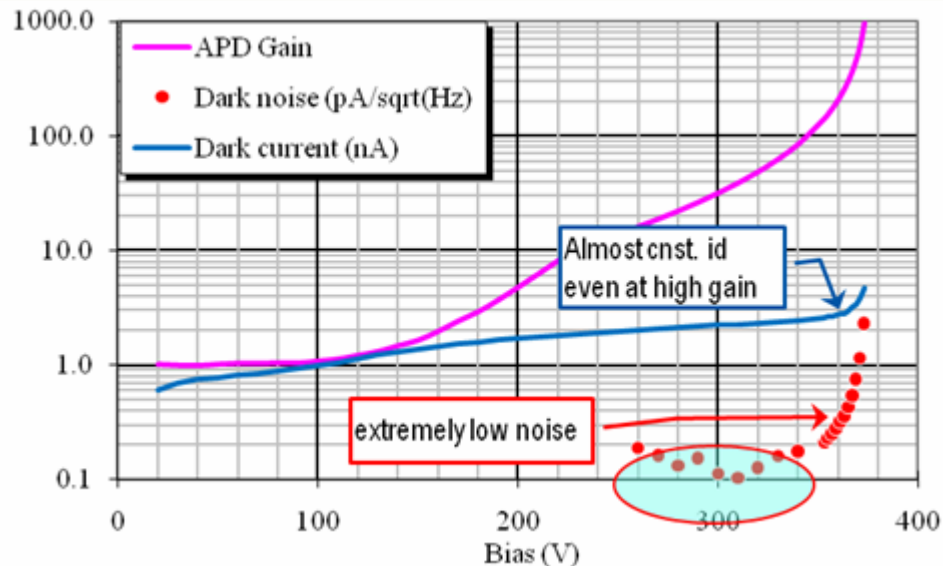


New "UV" line of detectors (1)

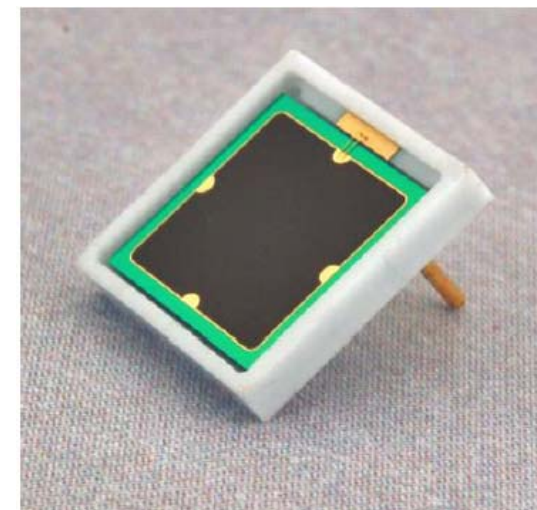
- UV – APD (available now)

Large area (active area 5.6 x 5.6 mm)

World's best performance in its size



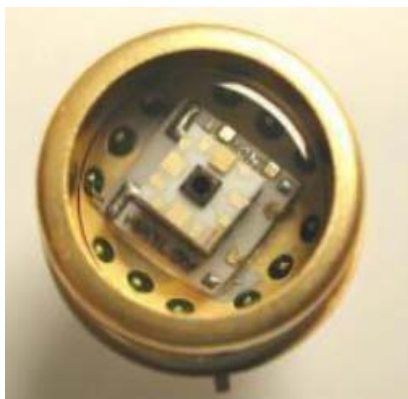
Symbol	Parameter	C30739ECERH (standard version)			C30739ECERH-1 (low gain version)			C30739ECERH-2 (high gain version)			Unit	Conditions
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
V_{br}	Breakdown Voltage	-	400	450	-	390	450	-	400	450	V	
dV	$dV = V_{br} - V_{op}$	-	25	-	-	40	-	-	10	-	V	defines Operating Voltage V_{op}
M	Gain at V_{op}	100	150	-	30	50	-	200	250	-		
Q.E.	Quantum Efficiency	60	75	-	60	75	-	60	75	-	%	at 430 nm
R	Responsivity	-	39	-	-	13	-	-	65	-	A/W	at 430 nm and typ. Gain M
C_J	Capacitance	-	60	-	-	60	-	-	60	-	pF	at V_{op}
t_R	Rise Time	-	2	-	-	2	-	-	2	-	ns	
I_D	Dark Current	-	3	-	-	3	-	-	3	-	nA	at V_{op}
I_N	Noise Current	-	0.4	-	-	0.4	-	-	0.5	-	pA/\sqrt{Hz}	at V_{op}



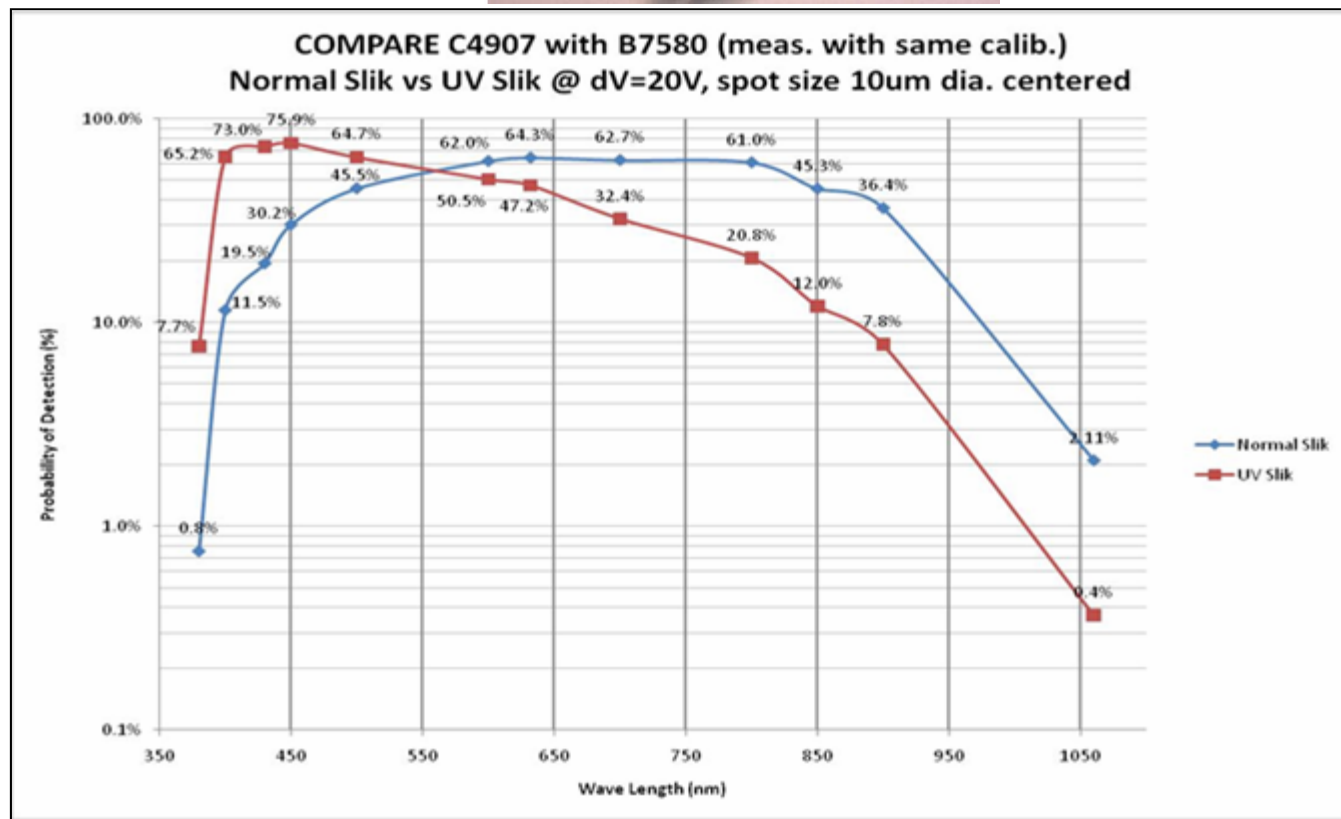
New "UV" line of detectors (2)

UV – SPCM (Preliminary results):

- Chip is UV – Slik™
- Dark counts~ 50cps at -8°C
- PDE at 420nm ~75%.

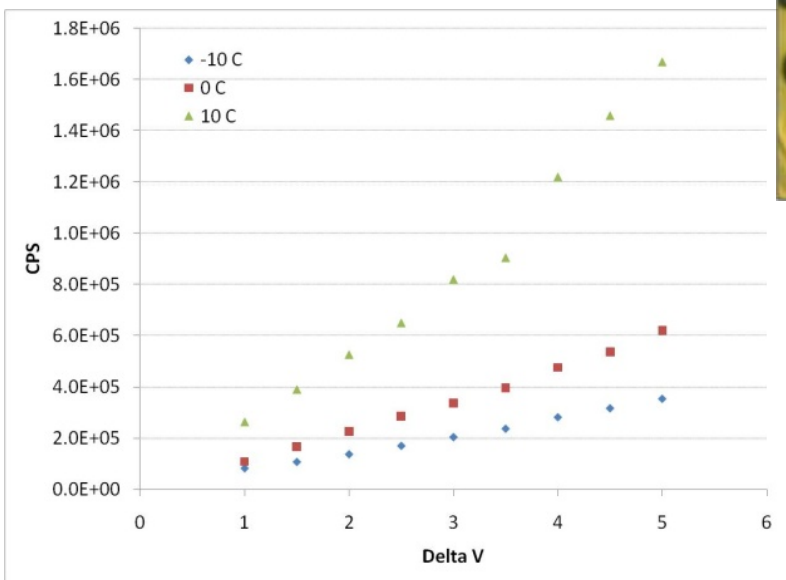
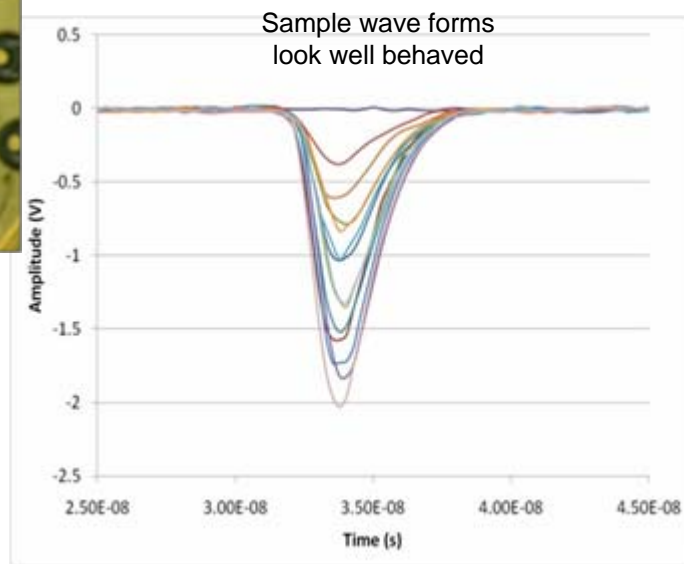
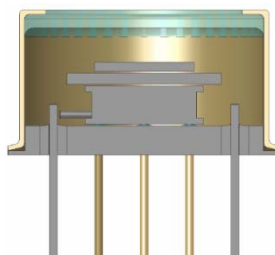
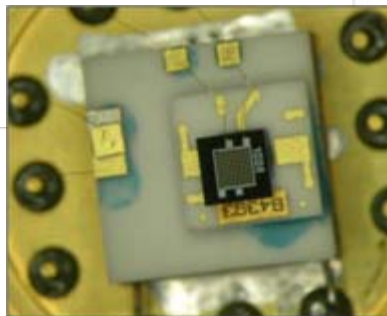
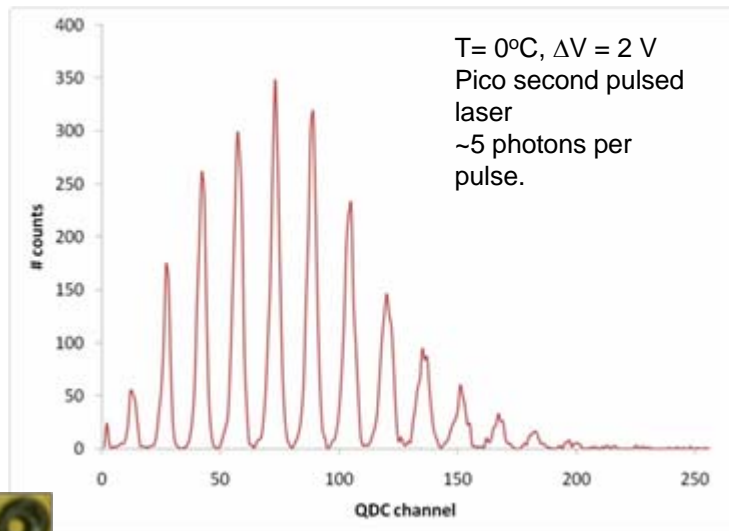


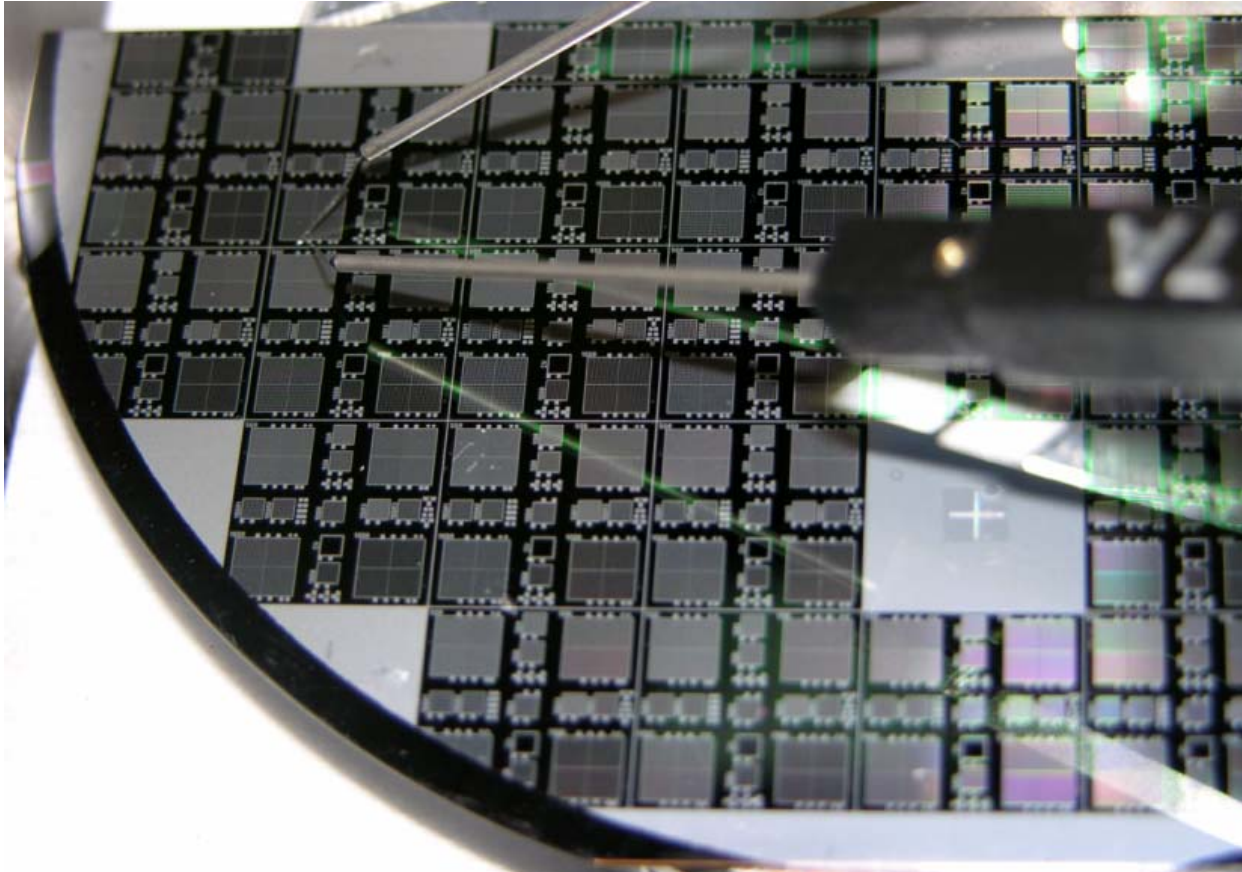
Samples available
soon



In development: UV – SiPM

- PKI – MEPHI Collaboration (ongoing)
- SiPM (various designs) in preparation
- Accent on low cross-talk, high PDE, low dark count
First prototypes completed
Characterisation in progress, chip on one stage TEC.
Samples available shortly
- Production in 2011





- 3D assembly of APD arrays in linear mode (XNAP project)
 - In progress: Still some development required, but process expected to be fully developed by Q1-2011
- 3D assembly of SiPM (including micro-pixel addressing and active quenching)
 - Exploring a program starting with Engineering Department of Université de Sherbrooke
- Would consider proposals for new detectors in new projects...
