Finger Lakes Instrumentation

PRELIMINARY

Kepler KL400 versus ProLine PL23042

ProLine and MicroLine cameras using the e2v CCD230-42 have been a standard for astronomy research since their release in 2012. The Kepler KL400 with back-illuminated CMOS provides an alternative with a higher signal-to-noise ratio (SNR) for exposures less than 7 minutes, as well as the potential for much higher frame rates.

The table below is a comparison of the ProLine PL23042 and the Kepler KL400 cameras, using a low flux value of 1 photon/pixel/second.

Signal-to-Noise Ratio
KL400 vs. PL23042

Exposure (sec)	400	23042
1 x 900	21.6	23.4
10 x 90	21.4	15.4
1 x 420	14.8	14.8
10 x 42	14.5	8.0

Summary: A Paradigm Shift

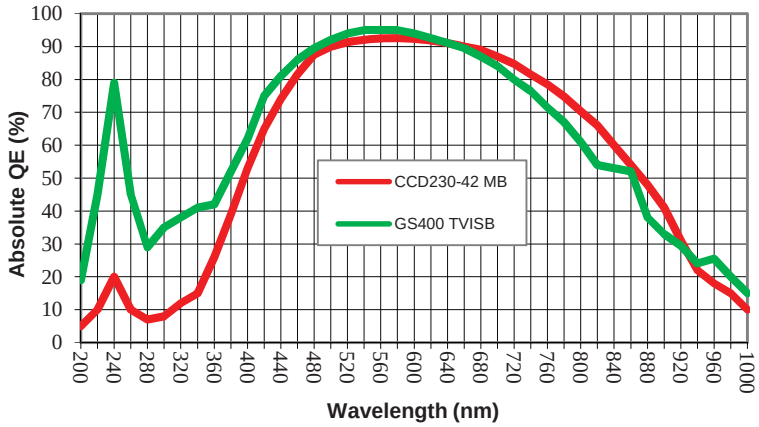
It is no surprise that the CCD's best performance is with a single long exposure. At 15 minutes, the PL23042 has a somewhat higher SNR than the KL400. What may be surprising is how little the Kepler KL400's signal-to-noise ratio changes when multiple images are stacked.

The benefit of taking multiple short exposures is the option to discard a bad exposure ruined by satellite trails, tracking errors, or bad seeing (etc.). Incredible low-noise images are now possible with a single long exposure or many stacked short exposures. The KL400's low noise allows it to be used for a wide range of applications and requirements.

	KL400	PL23042
Sensor Type	Back illuminated CMOS	Back illuminated CCD
Active Pixels	2048 x 2048	
Pixel Size	11 x 11 microns	15 x 15 microns
Effective Area	22.5 x 22.5 mm	30.7 x 30.7 mm
Sensor Diagonal	31.9 mm	43.4 mm
Full Well Capacity	90000 electrons	150000 electrons
Frame rate (rolling)	24 fps HDR	5 seconds/frame
Read Noise (rolling)	1.6 e- HDR	13 e- (500 kHz)
Dynamic Range	86 dB HDR	81 dB (500 kHz)
Peak QE	95% (TVISB)	93% (MB)
Cooling	Air (Optional Liquid)	
Dark Current	0.6 eps at -20C	0.2 eps at -30C
Interface	USB 3.0	USB 2.0
Interface (Optional)	QSFP[1]	NA
Data Bit Depth[2]	16 bit	
Optional Mount	F-mount	
Video size	2.0"	2.7"
Subarray Readout	Yes	
Electromechanical Shutter	Optional 65mm	Standard 65mm
Ex Trigger In	Yes	
Ex Trigger Out	Yes	
Software	FLI Pilot	FLIGrab
SDK	Open Source	
List Price	$20,995	$41,395

[1] QSFP=Quad Small Form factor Pluggable: high speed fiber optic interface.

[2] 16-bit data is merged from two 12 bit converters.



Quality. Cooled. Cameras.

Finger Lakes Instrumentation LLC
www.flicamera.com · 1250 Rochester St. · Lima NY 14485 USA · 585-624-3760