

Informal test of IR detection cards for optical table alignment

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DISCLAIMER: this was a subjective test under specific conditions in my own lab; no product endorsement or criticism is intended or implied.

We ran out of IR cards (yet again; where do they go??) so I bought several kinds and did a shootout in the det lab. The detectability threshold is defined as follows: sufficient power for me to just see a 1 mm diameter 1064 nm wavelength CW beam, determine where it is, and guess if it's grossly clipped. This is judged in a darkened room with sufficient light not to stumble, but insufficient to read a newspaper (both factors to be judiciously qualified by my advanced age). I wear Trinity multiwavelength laser glasses with a photopic transmission somewhere around 50%, and neutral perceived color. Here is what I found:

mfg.	model	type	thresh	notes
Sumita	YagGlass	anti-Stokes	100 mW	glass
Kentek	View-It(IR)	anti-Stokes	20 mW	ceramic, opaque
Kodak	845 7525	phosphor	.01 mW	NLA
NewFocus	5841	phosphor	.02 mW	NLA
AST	VISualize	phosphor	.01 mW	opaque
AST	VisualizeIR	anti-Stokes	2 mW	opaque(card)/trans.(wand)
Lumitek	Q-42-T	phosphor	.005 mW	translucent
Lumitek	L-IR-T	anti-Stokes	10 mW	translucent

The phosphor types need to be "precharged" by exposure to fluorescent room lights or daylight. The phosphors also fade and bloom, so you have to move the card around and it's all but impossible to judge spot size, shape or relative power from the the image. The anti-Stokes types don't need precharging and give a stable, compact emission for a stable incident beam; however they respond to the square of the power, and thresholds are much higher. On the other hand, this makes them handy to locate a small waist axially; at a certain power, the card just "lights up" rather abruptly as the card passes through the focus.

Everyone wants the NewFocus 5841 card but it's apparently no longer available. The one 5841 sample I have is somewhat less sensitive than newer phosphor-type cards, but has both reflective and transmissive portions, plus the phosphor extends all the way to an edge AND there's a transparent 2 mm hole which is very handy. I suggest cutting and punching newer cards to emulate these features, but you should quickly re-laminate them; the phosphor is hygroscopic and will go bad with exposure to humidity.

Of the newer cards tested, the most sensitive for very weak beams is the Lumitek

Q-42-T (the Q-42-R is an opaque version). It reliably detects 5 microwatts in a 1 mm beam. However the AST VisualizeIR anti-Stokes card turns out to be significantly more sensitive than others of this type, allowing alignment without precharging, blooming or memory on as little as a few milliwatts. You have to get the more expensive "wand" form factor for translucency, however.

Only the Kentek and Sumita units are made to take high power (> 100 mW or so in a small beam). The Sumita is neat because it more or less leaves the beam intact to continue on its way.

Refs:

AST (Applied Scintillation Technologies), www.appscintech.com Note: AST requires a \$500 min. order to order direct; use, e.g., Edmund Optics for small quantities, www.edmundoptics.com (Edmund p/n 55-295 for VisualizeIR wand, p/n 55-292 for card).

Lumitek, www.lumitek.com

Kentek, www.kentek-laser.com

Sumita, www1.sphere.ne.jp/sumita/