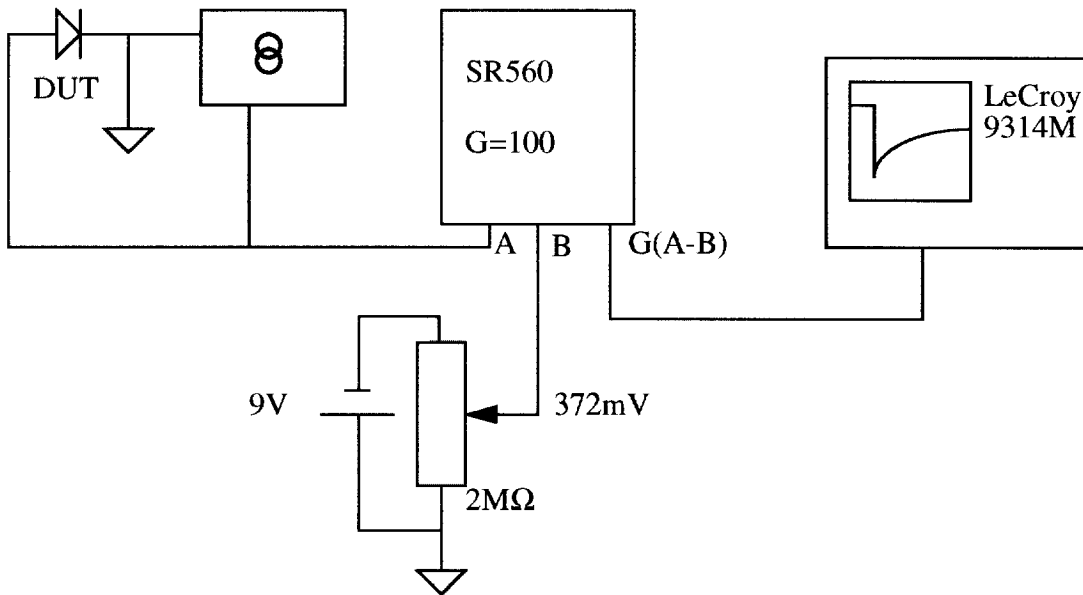
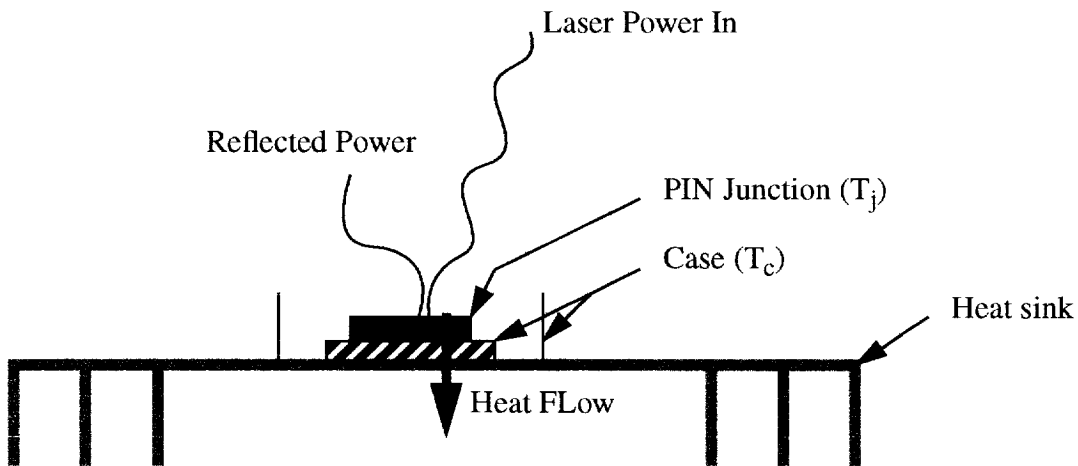


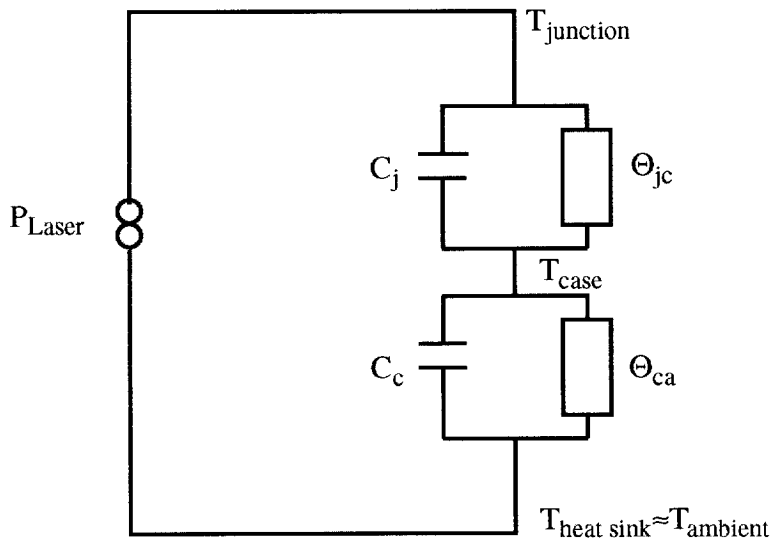
# Thermal Impedance

- Measurement setup



# Thermal Impedance

- Equivalent Thermal “Circuit” Model

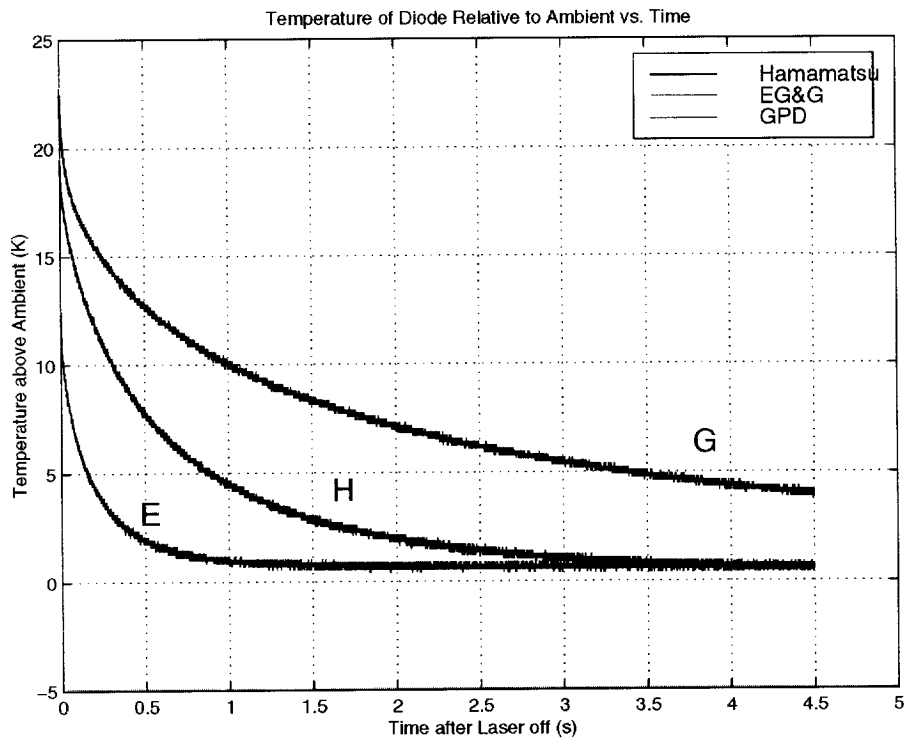


- Solution

$$T_j(t) = P_{Laser} \left[ \Theta_{jc} e^{-\frac{t}{\Theta_{jc} C_j}} + \Theta_{ca} e^{-\frac{t}{\Theta_{ca} C_c}} \right]$$

# Thermal Impedance

- Results



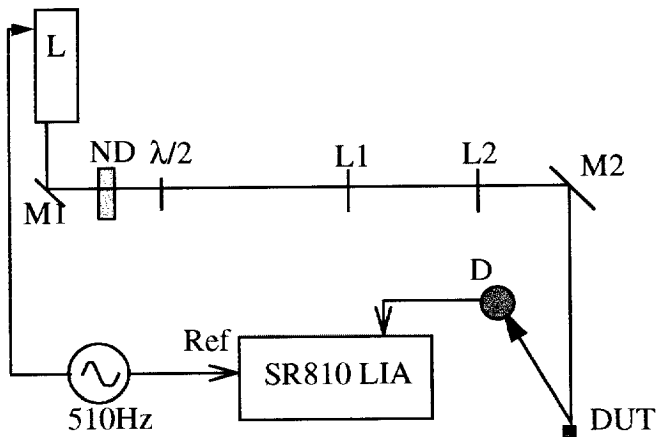
**Table 1: 2mm Diode Thermal Impedances**

Diode	Thermal Impedance (K/W)	Approx <sup>a</sup> . Time Constant (s)
Hamamatsu (G5832-2)	25	0.57
EG&G (C30642G)	17	0.16
GPD (GAP2000)	28	1.6

a. This is the time it takes for the traces in the above figure to fall to 1/e of their initial values. It ignores the second time constant predicted by the solution on the previous page

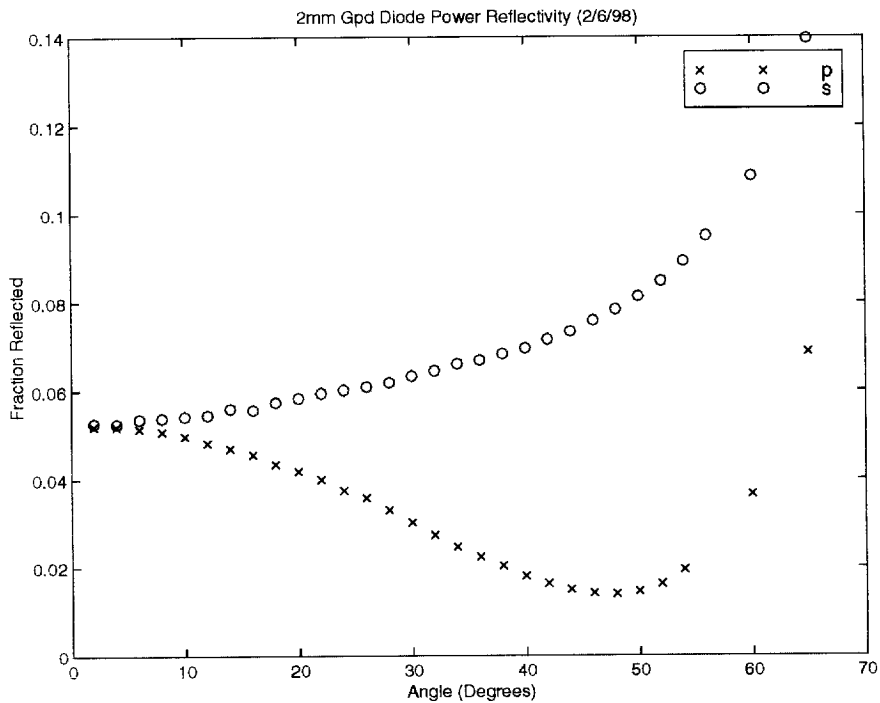
# Diode Reflectivity GPD

## • Setup

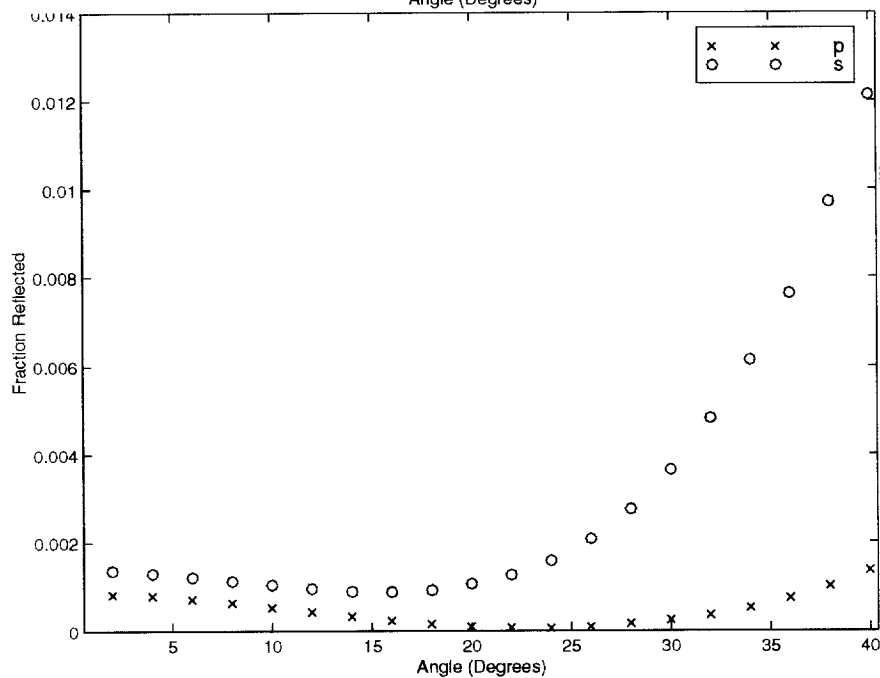
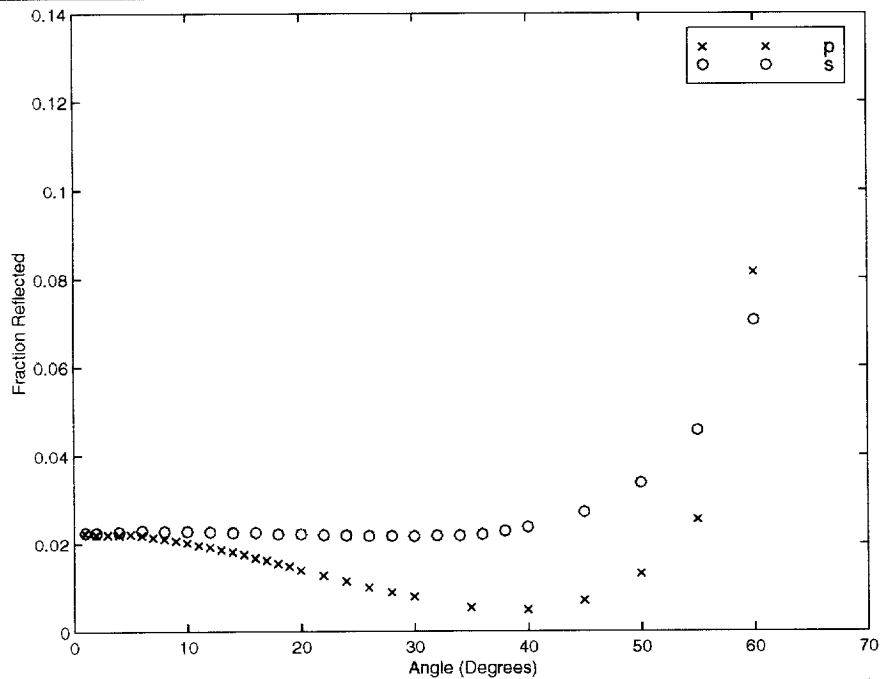


- L - Laser (1.064 $\mu$ m)
- L1, L2 - Lenses
- ND - Neutral Density Filter
- $\lambda/2$  - Halfwave plate
- DUT - Diode under test
- D - Detector

## • GPD



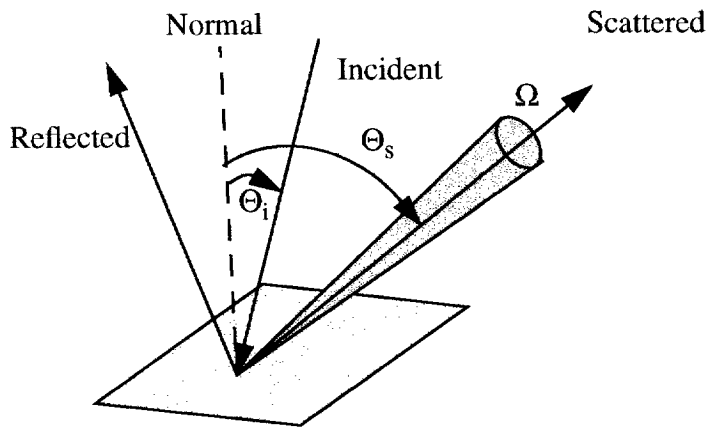
# Diode Reflectivity EG&G and Hamamatsu



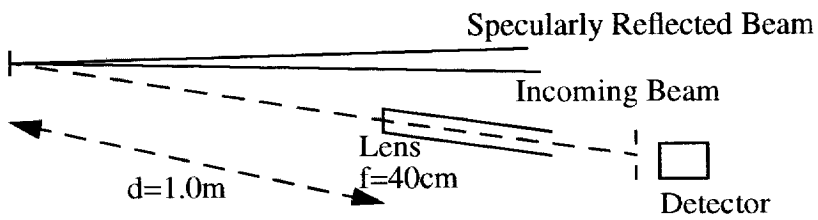
# Diode BRDF

- Definition

$$BRDF \equiv \frac{P_{out}}{P_{in}\Omega}$$



- Setup



# Diode BRDF

---

- Results

**Table 2: 2mm Diode Backscatter**

Diode	BSDF (BRDF) at 6.5° (10 <sup>-4</sup> /ster)
Hamamatsu (G5832-2)	1.1
EG&G (C30642G)	0.37
GPD (GAP2000)	0.11

*Note 1, Linda Turner, 04/20/98 05:33:30 PM*  
LIGO-G980049-22-M