

# R30-4 gun S&A during electrode assembly installation and laser retro- reflection evaluation

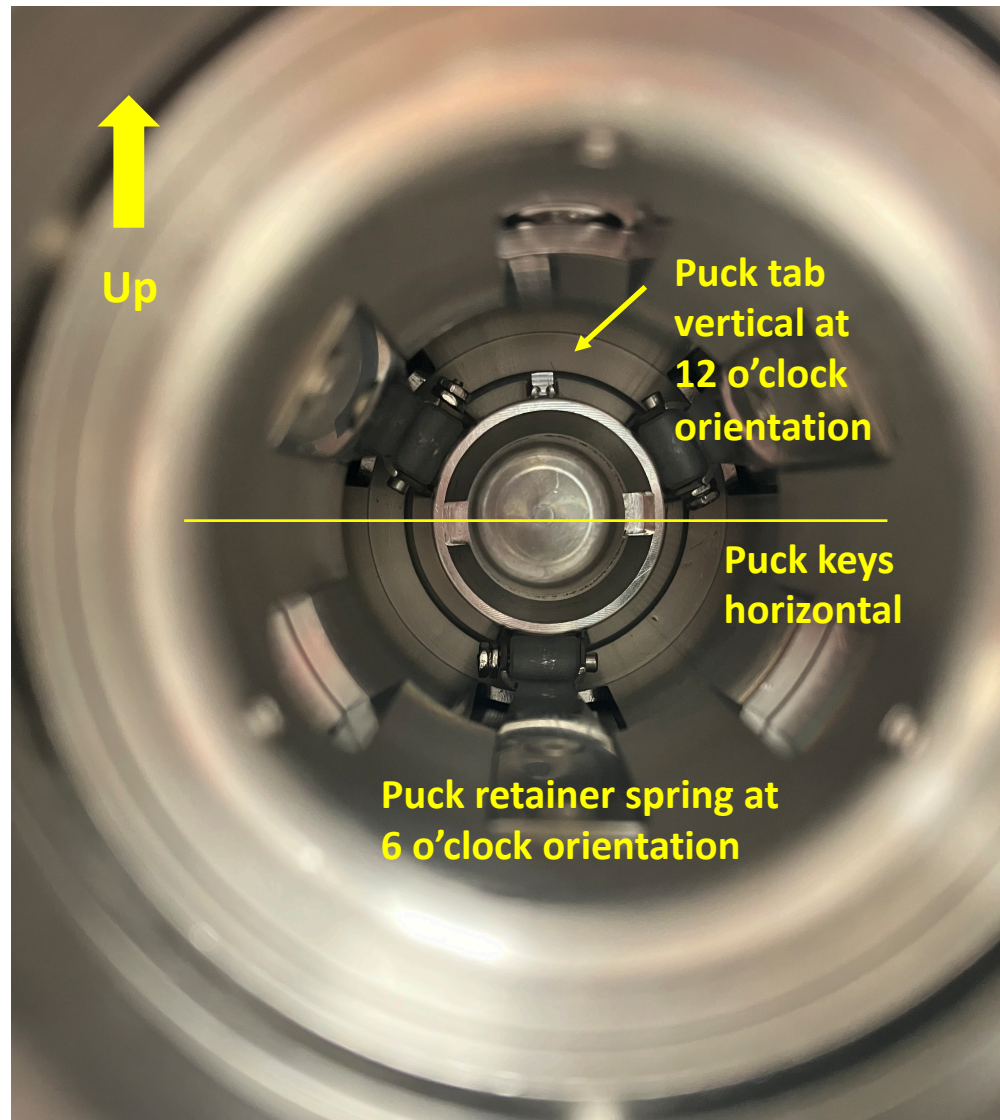
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S. Hardisty, R. Ammons

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R30-4 gun electrode assembled on April 25, 2024  
with 16/30 front end

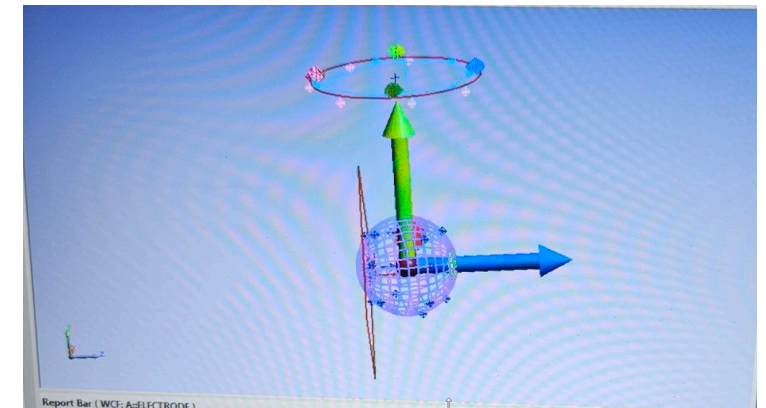
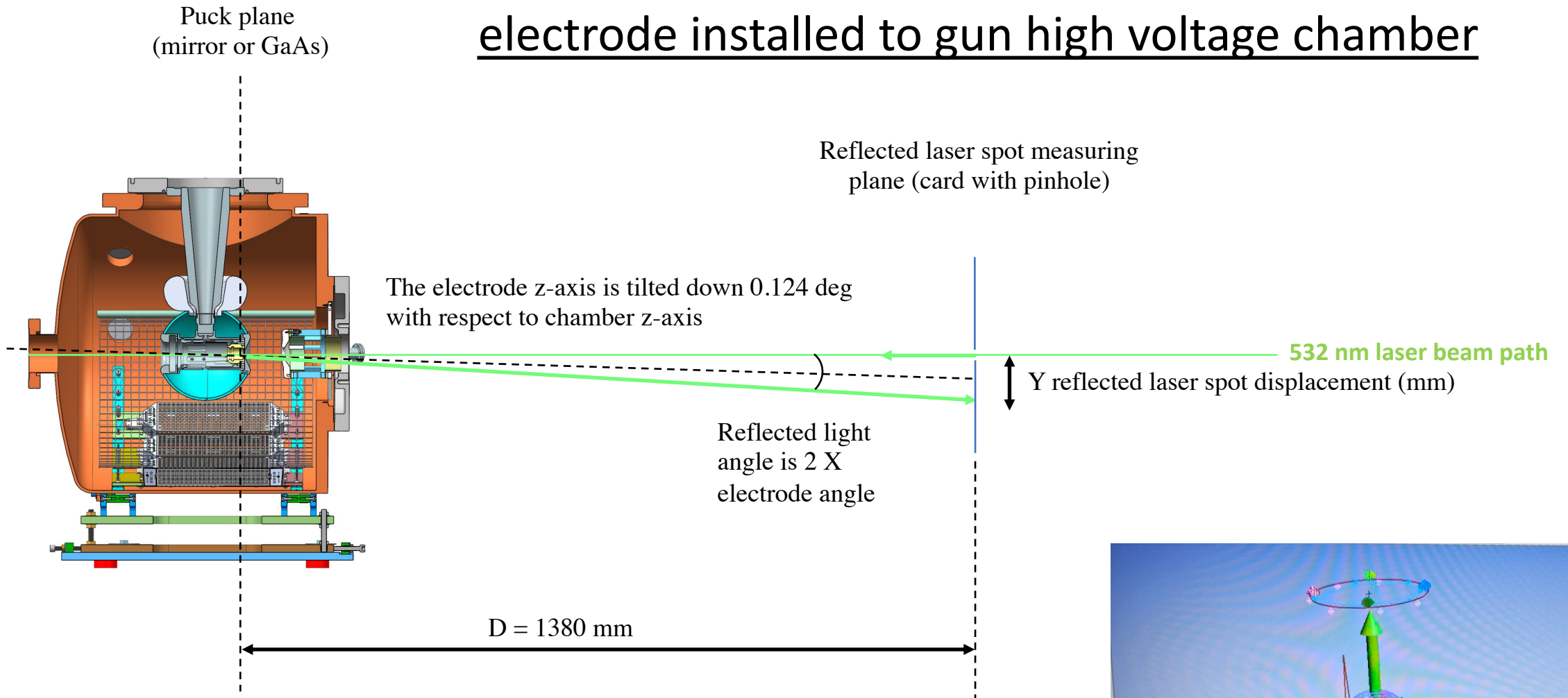


R30-4 gun puck retainer assembly orientation



R30-4 back end zoomed in showing orientation of puck  
retainer assembly to be used for installing puck with  
ear (tab) up

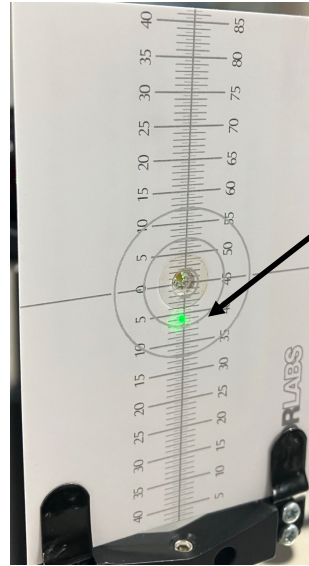
# S&A setup to evaluate laser retro-reflection with R30-4 electrode installed to gun high voltage chamber



S&A reports that the electrode z-axis is 0.124 deg pointing down wrt to the gun HVC z-axis

# Laser colinear with R30-4 gun high voltage chamber z-axis

Mirror puck  
ear up



## Mirror puck

$$\theta = \text{atan}(Y/D)$$

$$Y = 6 \text{ mm}$$

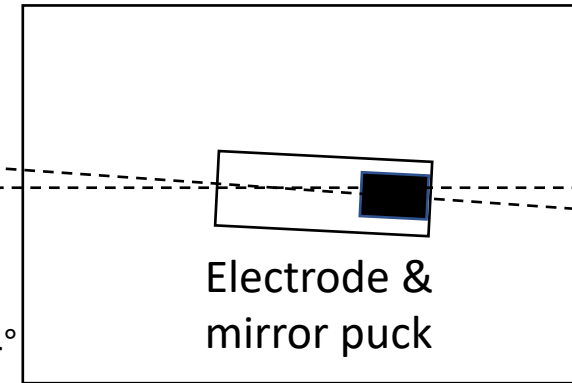
$$D = 1380 \text{ mm}$$

$$\theta = 0.249^\circ$$

$$\text{Electrode z-axis angle} = \theta/2 = 0.124^\circ$$

**Agrees with S&A measurement**

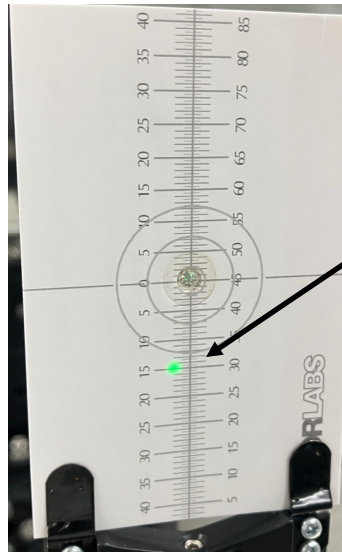
High voltage chamber



Electrode &  
mirror puck

$$\theta = 0.124^\circ$$

GaAs wafer on Moly  
puck # 35 ear up



## GaAs on Moly puck # 35.

$$\theta = \text{atan}(Y/D)$$

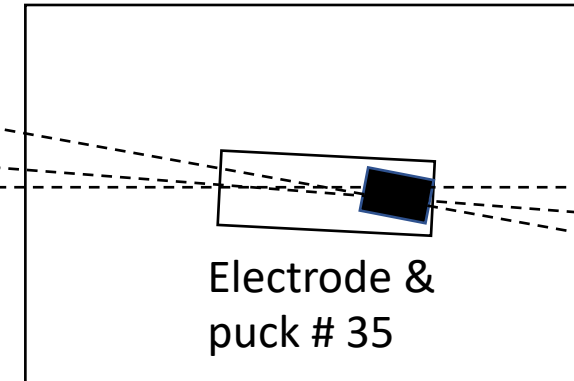
$$Y = 15 \text{ mm}$$

$$D = 1380 \text{ mm}$$

$$\theta = 0.624^\circ$$

$$\text{GaAs puck \# 35 z-axis angle} = \theta/2 = 0.312^\circ$$

High voltage chamber



Electrode &  
puck # 35

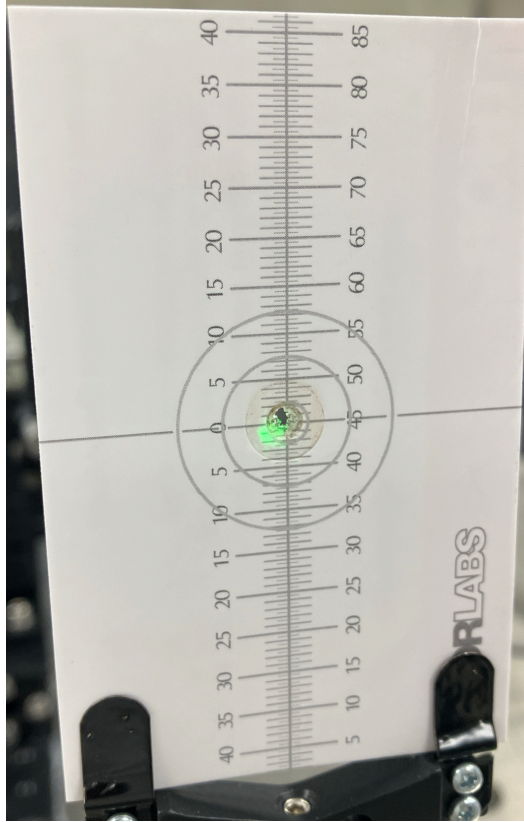
$$\theta = 0.312^\circ$$

**Is the Moly puck z-axis tilted?**

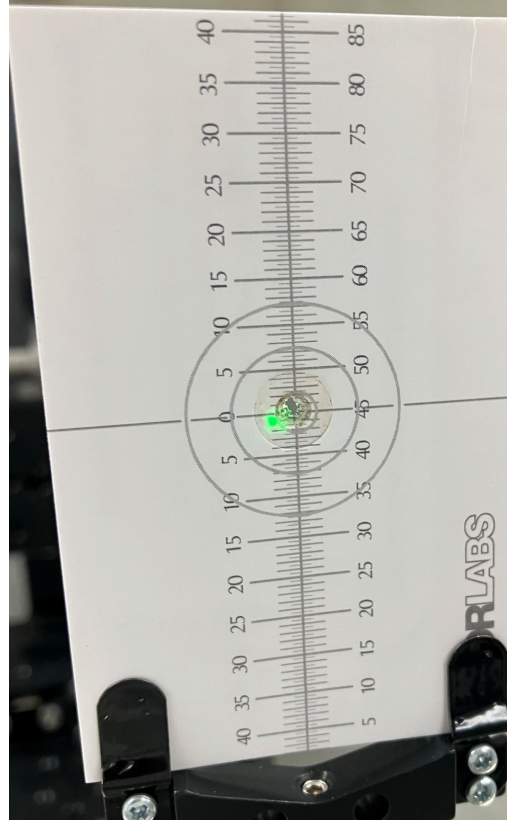
**Or is the GaAs wafer plane tilted wrt to the moly puck z-axis?**

# Laser colinear with R30-4 gun electrode z-axis

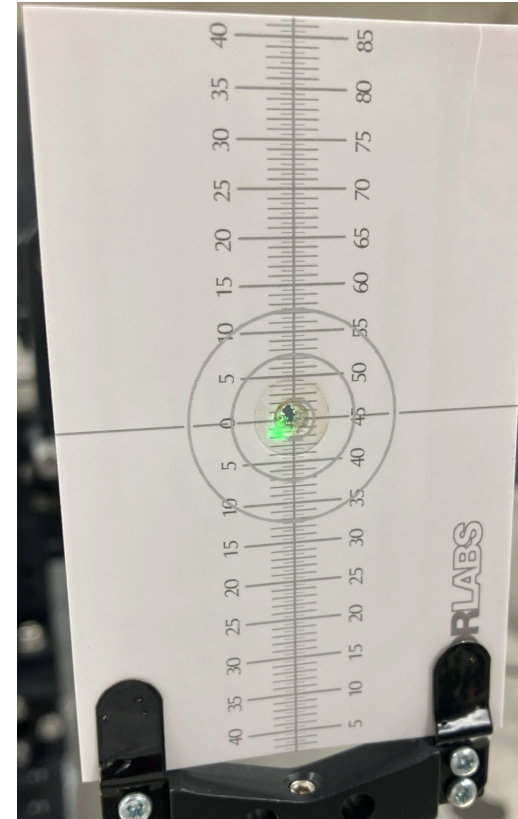
## Mirror Puck



Ear to the left



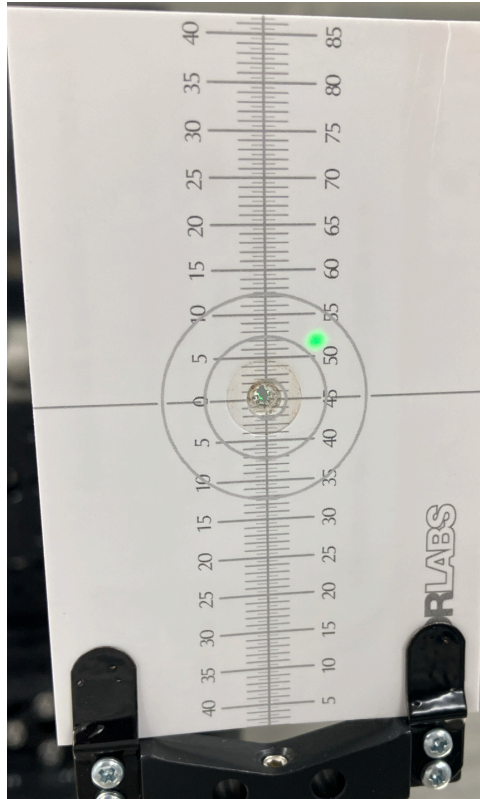
Ear up



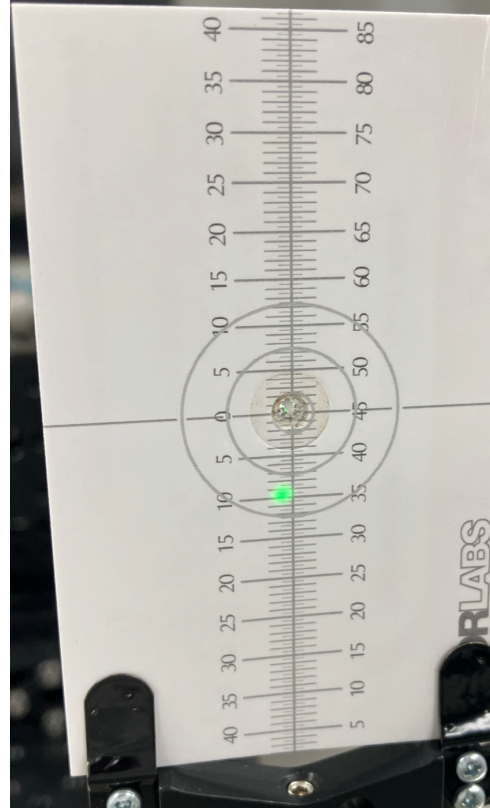
Ear to the right

# Laser colinear with R30-4 gun electrode z-axis

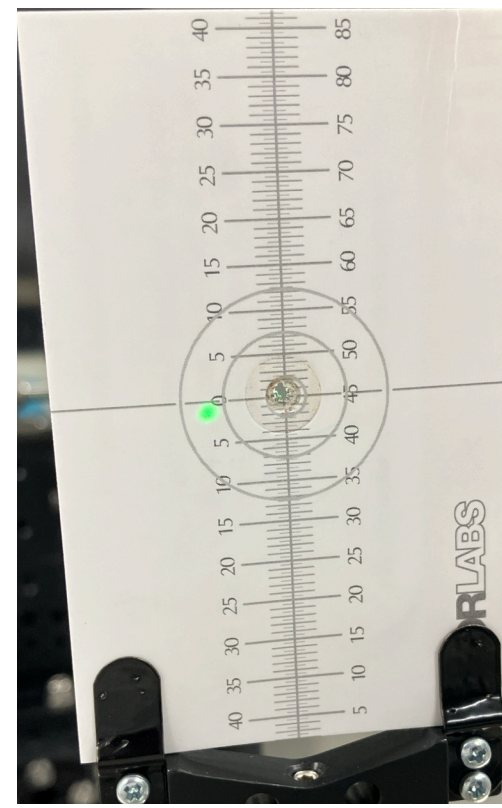
## GaAs on Puck # 35



Ear to the left



Ear up



Ear to the right

**The rotation (same  $r = 9$  mm) of the reflected laser spot indicates the GaAs plane is not parallel to that of the puck**

A 50 micron gap offset in the GaAs wafer wrt to the puck plane explains the observed laser retro-reflection spot displacement and rotation

