

# PHOTOLUMINESCENT INTENSITY

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# Project Outline:

Photoluminescent Intensity (PLI)

Defect Density Descriptions

Fit Data for Modeling

Solvers – Method of Relaxation / 2-d Diffusion

Model Adequacy Check

# Photoluminescent Intensity (PLI):

Chalkboard demonstration

Semi-conductor Material

- Absorbs
- Transmits
- Reflects

Measure emitted photons intensity

# Photoluminescent Intensity (PLI):

Recombination - photons emitted (luminescence)

Photons

- trapped (reabsorbed)
- internal reflect
- escape (intensity)

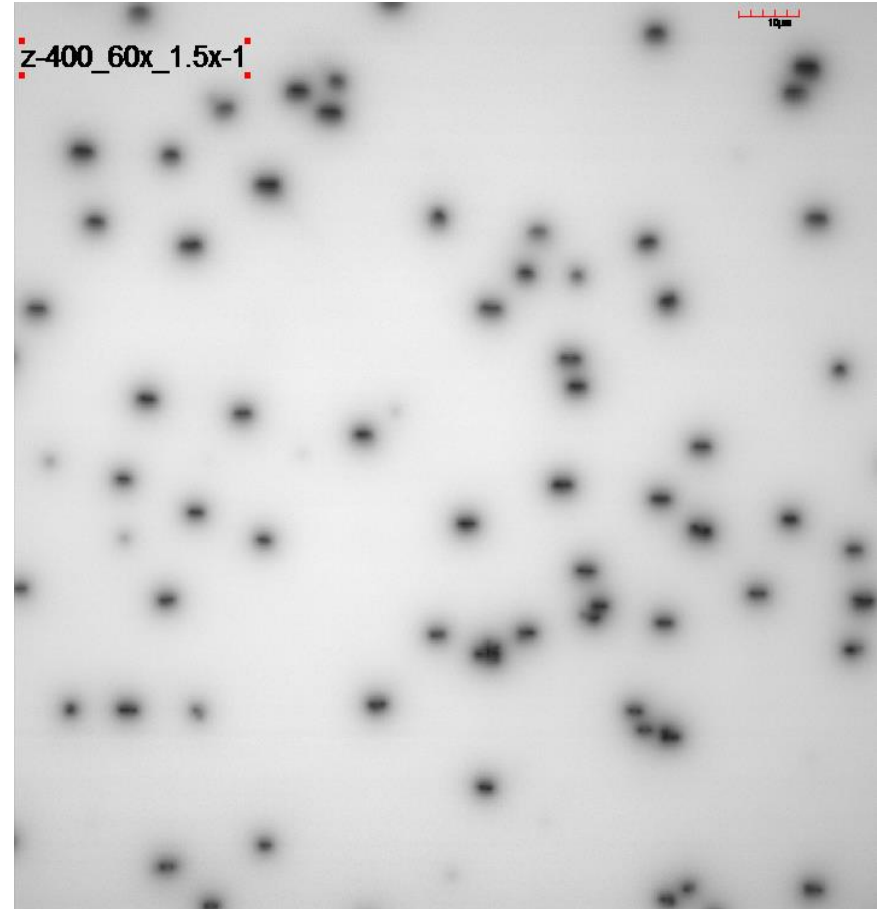
Electron – Holes Pairs

# Defect Density Descriptions:

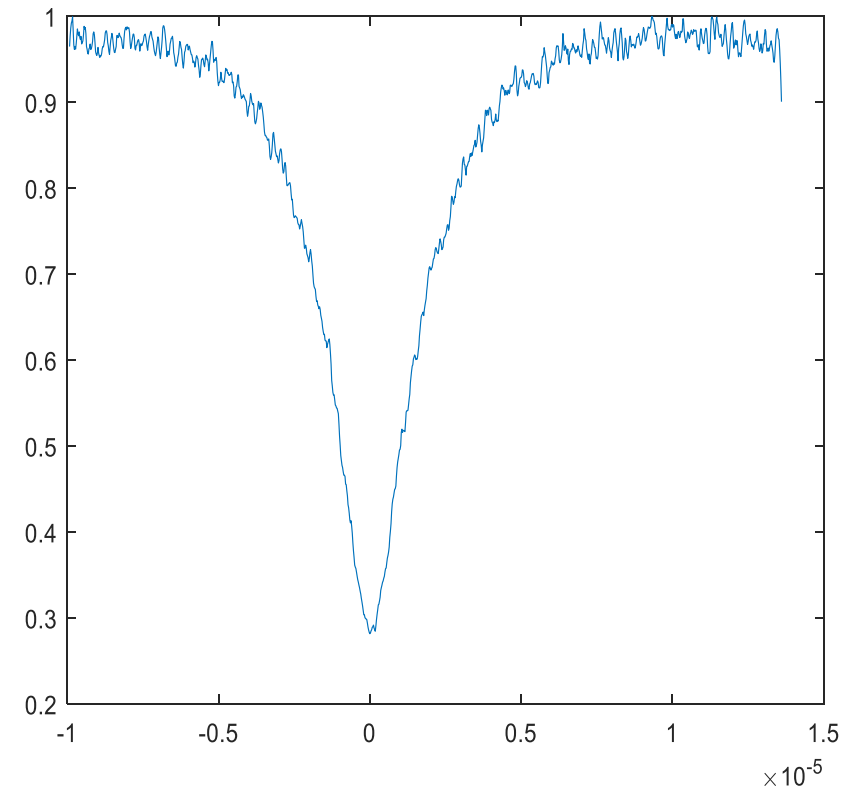
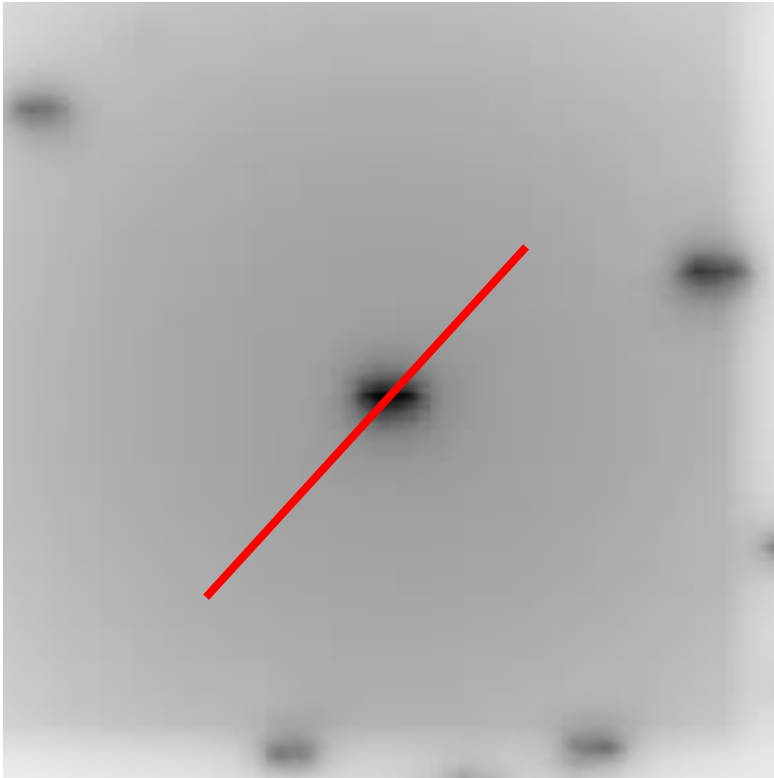
10<sup>-6</sup> meter scale

Surface defects

What is happening?



# Defect Density Descriptions:



# Solvers – Method of Relaxation:

Large sparse linear systems

Linear least squares

Finite-difference discretization of  
differential equations

# Solvers – Method of Relaxation:

Models Elliptic partial differential equation

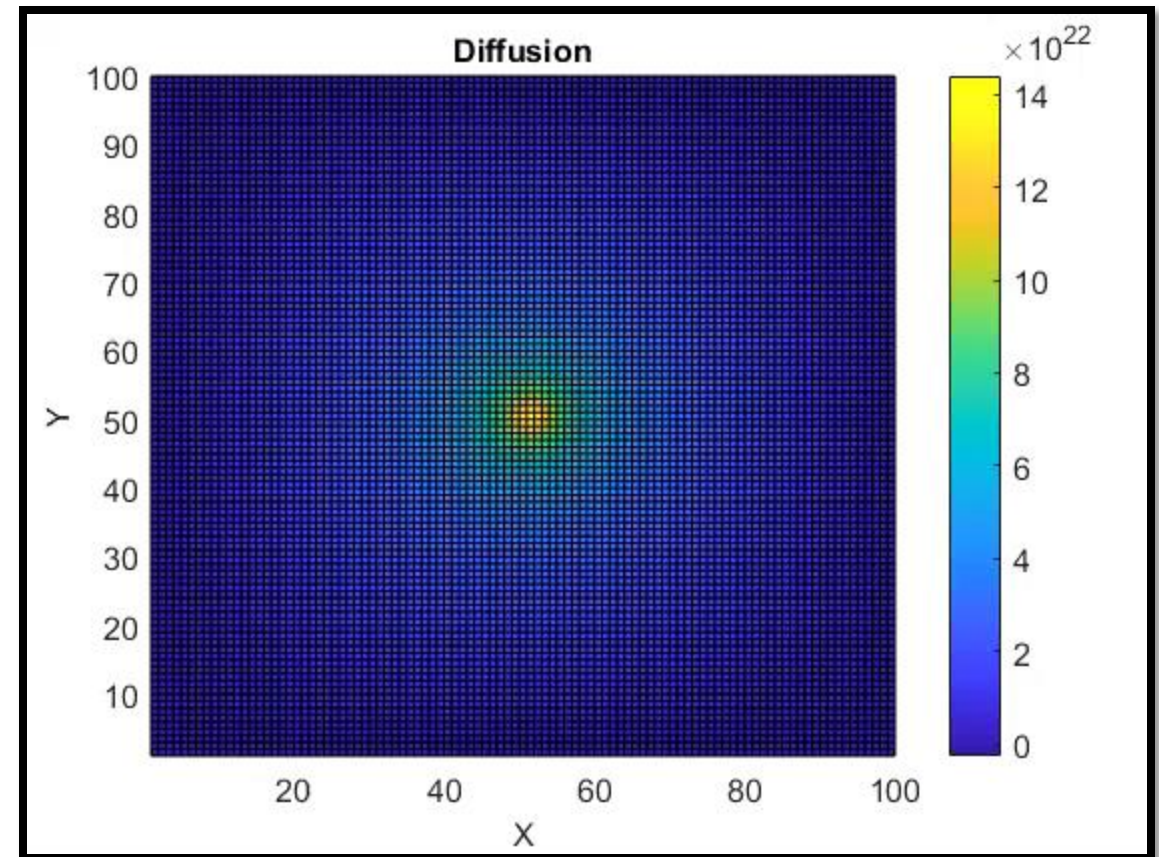
- Laplace's equation
- Poisson's equation
- Boundary-value problems



# Solvers – Method of Relaxation / 2-d

## Diffusion:

- 1<sup>st</sup> iteration @  
boundary = 0
- 2<sup>nd</sup> iteration



# *Model Adequacy Check:*

Are the boundary conditions zero?

Parameter adjustments

