
MNT^eSIG

MICRO NANO TECHNOLOGY
education
SPECIAL INTEREST GROUP



MNTeSIG Live! 2021

Quantum to Solar Cells

By Atilla Ozgur Cakmak

Dear MNTeSIG Family,

Please find the uploaded documents for my presentation here with the given links for my presentation. You can always reach out to me from aoc10@psu.edu with your questions. I will give a brief description of the materials in the list.

- 1) [Pitch Talk](#):
- 2) [Presentation file](#)
- 3) [Longer Talk](#):
- 4) Animations from PVEducation.org webpage: You will need a flash animation player as Windows does not support Adobe Flash anymore. You can search for other reliable alternative flash players.
 - a. [Band-gap](#):
 - b. [Equilibrium carrier concentration](#):
 - c. [dopingN](#):
 - d. [dopingP](#):
 - e. [drift force](#):
 - f. [diffusion](#):
 - g. [pnjunction](#):

- h. [pnjunction2](#):
 - i. [lightrapping](#):
 - j. [surface texturing](#):
 - k. [absorption of light](#):
 - l. [light generated current](#):
 - m. [types of recombination](#):
 - n. [surface recombination](#):
 - o. [solar cell parameters](#):
 - p. [screen printing](#):
- 5) Animations and Interactive Tools from Phet University of Colorado webpage: You may need to install Java for some of these. Phet website has an extended amount of simulations available from K-12 to undergrad level: [PhET: Free online physics, chemistry, biology, earth science and math simulations \(colorado.edu\)](#)
- a. [Blackbody spectrum](#):
 - b. [Bound states](#):
 - c. [Conductivity](#):
 - d. [Hydrogen atom](#):
 - e. [Photoelectric](#):
 - f. [Quantum wave interference](#):
 - g. [Rutherford scattering](#):
 - h. [Semiconductor](#):
 - i. [Wave interference](#):
 - j. [Waves intro](#):
- 6) Our main contribution in the form of individual MATLAB codes. These will be compiled under a single standalone APP soon. Once achieved, it will not require a MATLAB license, too. Please see the long video for instructions on how to run them. In the meantime, you can also download and run some of them with the MATLAB clone: [Download \(gnu.org\)](#)
- a. [Code1](#):
 - b. [Code2](#):
 - c. [Code3](#):
 - d. [Code4](#):
 - e. [Code5](#):
 - f. [Code6](#):
 - g. [Code7](#):
 - h. [Code8](#):
 - i. [Code9](#):
- 7) This is an in-class demonstration of a longer experience with Adept 2.1 from nanohub. We did run this virtual lab with URM students hosted by NSU in Summer 2019. [Virtual Lab Solar Cell - YouTube](#)