

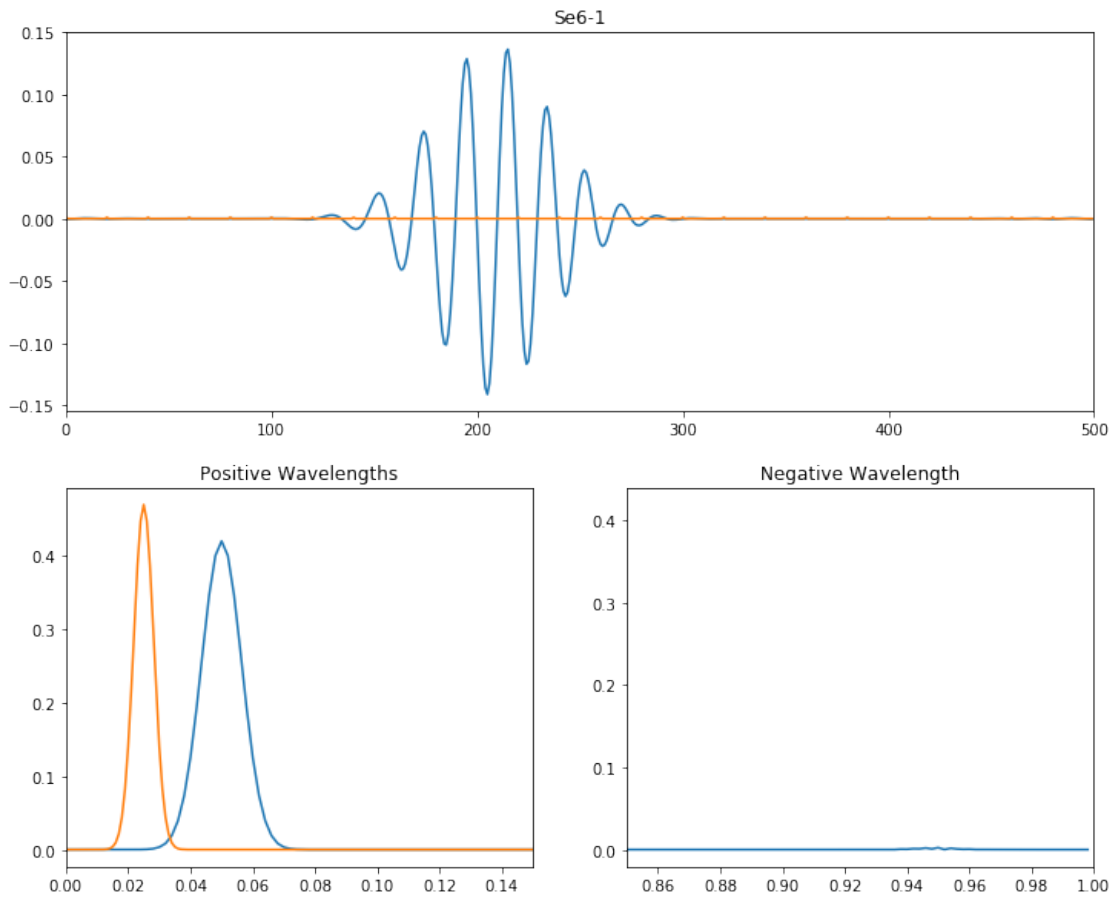
# ECE 462 - Homework #8

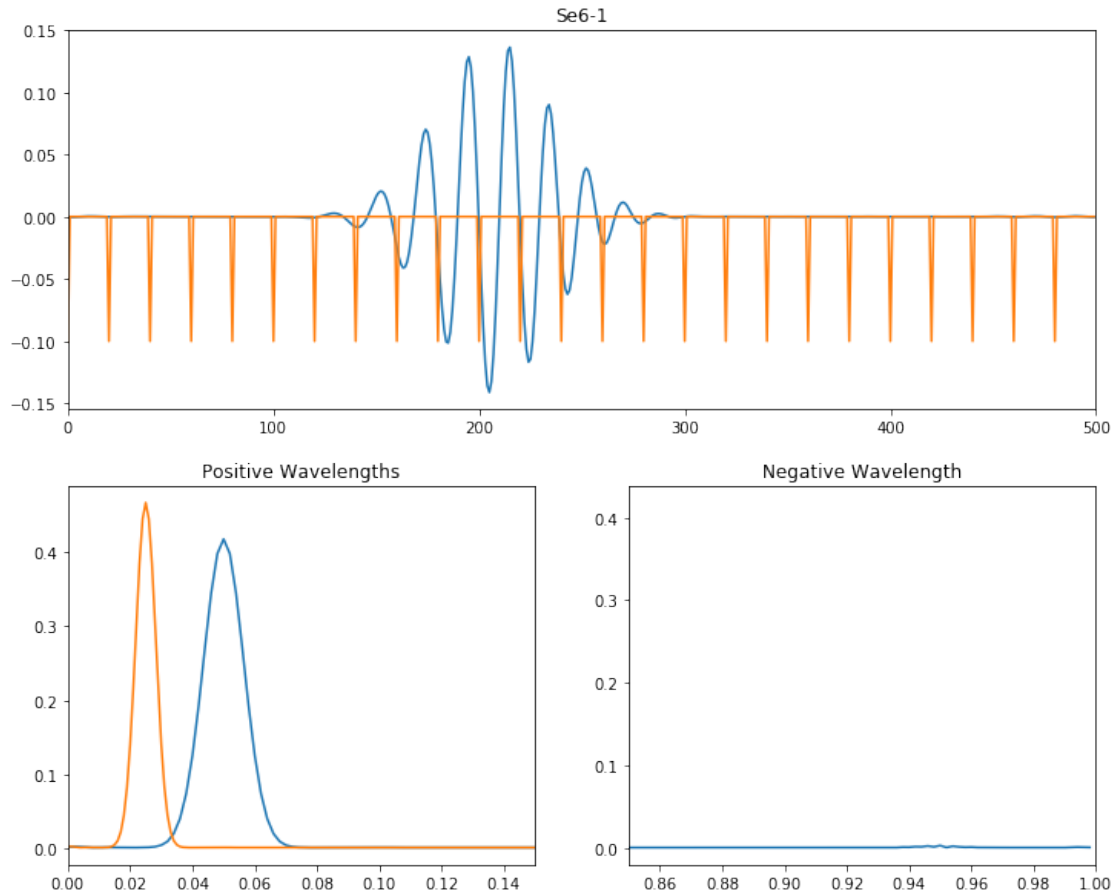
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## 1 Problem 6.1.1

There is no difference between the two simulations, showcasing how the exact energies of the lattice are not nearly as impactful as the structure (spacing) of the lattice itself. Below are the two simulations, with the first image being the new energy lattice, and the second image being the original energy lattice. After the same amount of iterations, the two simulations in both the  $k$  and  $x$  domain are identical.





## 2 Problem 6.1.3

$$\lambda_n = \frac{2d}{n} = \frac{2 \cdot 50 \text{ \AA}}{1} = 10 \text{ nm}$$

$$E = \frac{\left(\frac{h}{\lambda}\right)^2}{2m} = \frac{\left(\frac{6.58 \cdot 10^{-16}}{10 \cdot 10^{-9}}\right)^2}{2 \cdot 9.109 \cdot 10^{-31}}$$

Thus, the energy range for the conduction band is:  $E = 15 \text{ meV}$