Homework 3

November 9, 2018

1 Problem 1

Here are the results from Ultrafine, Wigner, Bell-Wigner, and Roman.

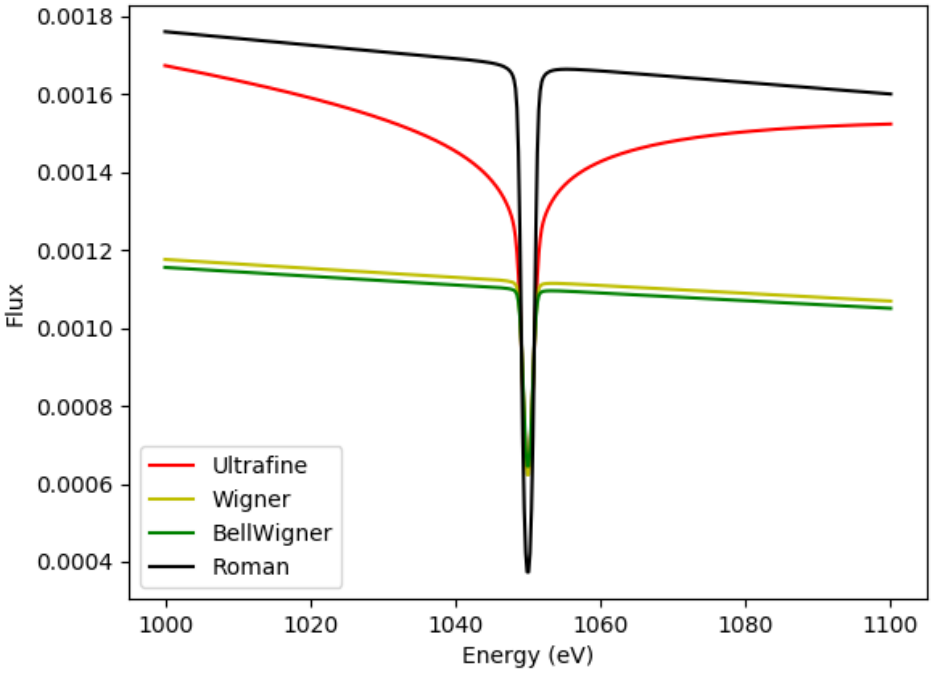

Figure 1:

Using the subgroup information from the matlab script, I got that

$$\sigma_g = \frac{\sum w_n \sigma_n \phi(\sigma_n)}{w_n \phi(\sigma_n)} = 0.193859 \text{ b}$$

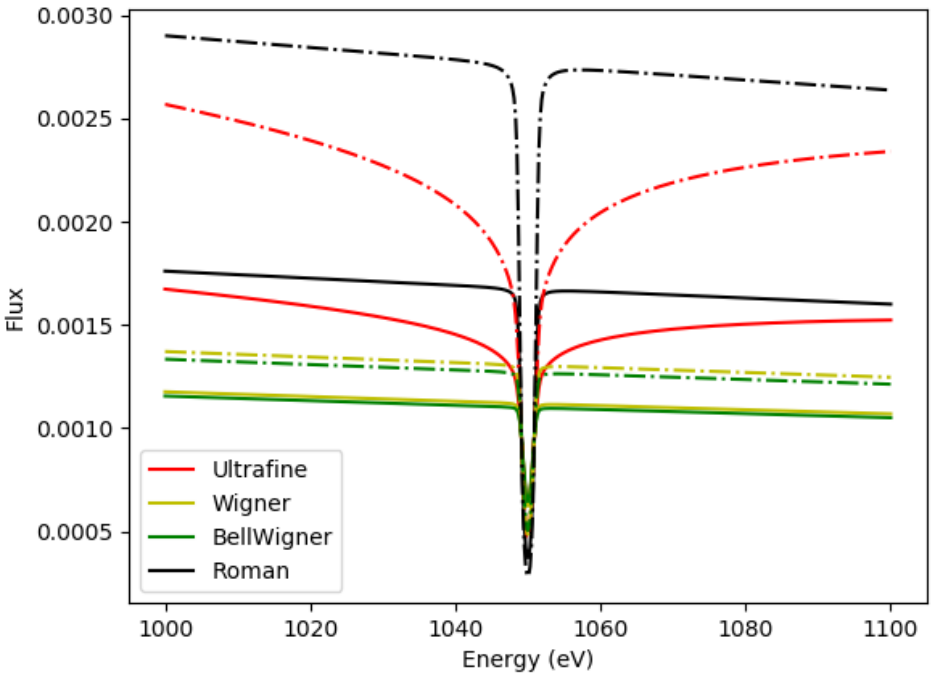

Figure 2:
Solid line = 0.4 cm, while dashed one is equal to 1.0 cm.

In the above figure, the solid line is with thickness equal to 0.4 cm, while the dotted/dashed line is for a slab of thickness 1 cm. It's neat to note that the Wigner and Bell-Wigner are less affected by changing slab thickness than Roman and Ultrafine are.

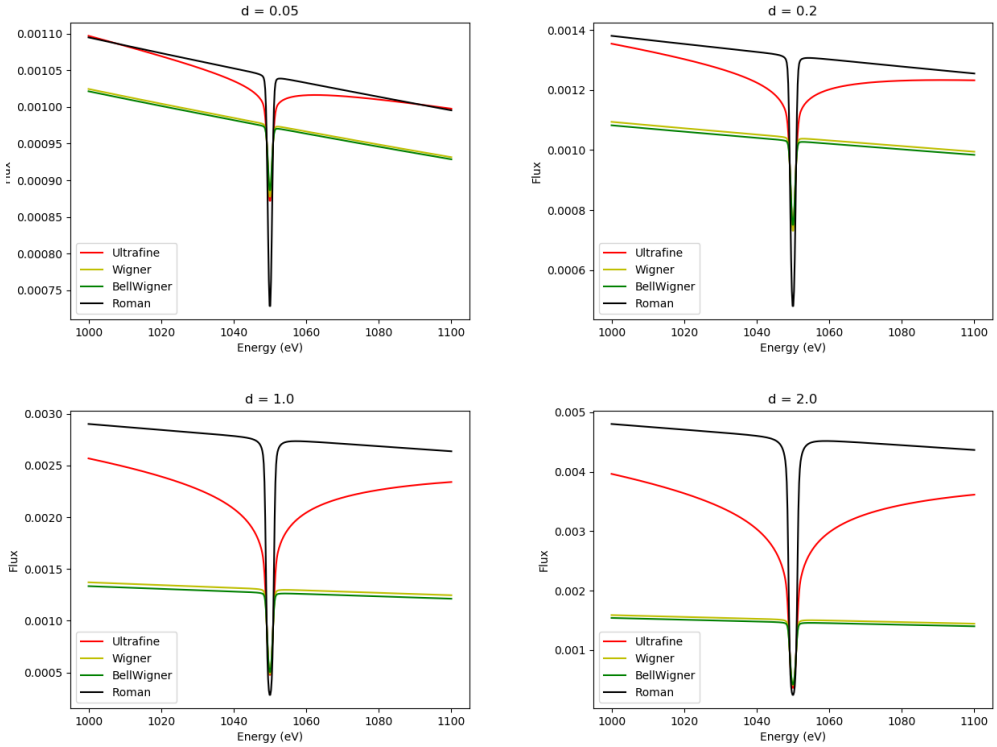

Figure 3:
Slab withs of 0.05 cm, 0.2 cm, 1.0 cm, 2.0 cm

Note that as the slab gets thicker, everything gets worse away from the resonance. Roman typically tends to be not so great exactly on the resonance, but it tends to look pretty nice away from the resonance. Wigner and Bell-Wigner have look rather similar. In my opinion, I think I'm a bit of a fan of Roman.

2 Problem 2

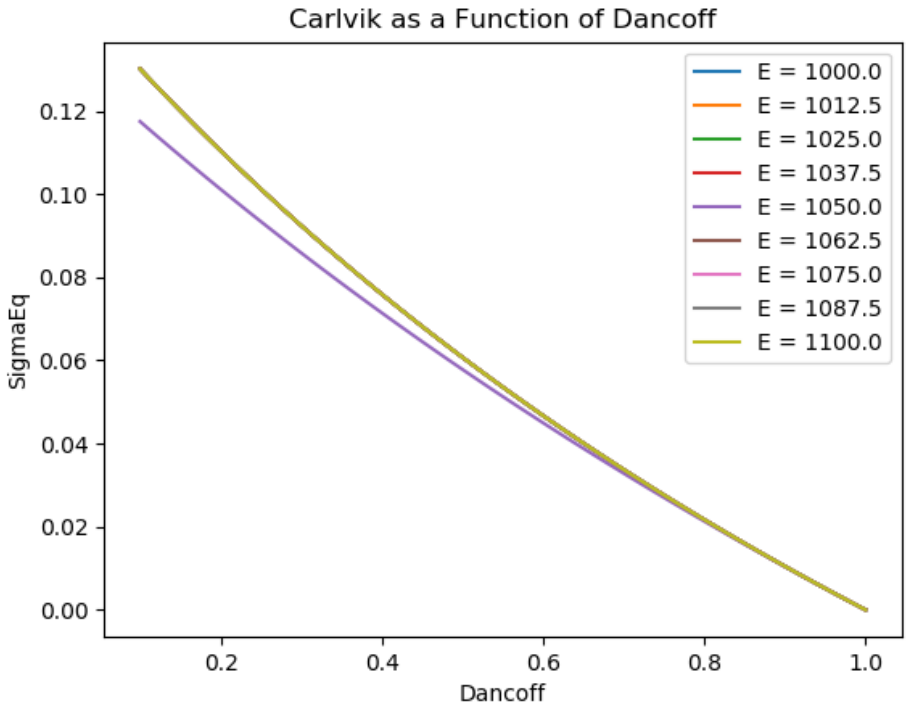

Figure 4:
I did this for a number of different energies. Note that only when the energy is right over the resonance does it act any different from other energies.