

Surface Plasmon Resonance	
1	dispersions relation in general
2	the dispersion relation for light in vacuum
3	the dispersion relation for light in a metal
4	the dispersion relation for light in a dielectric
5	the dispersion relation for an electron in vacuum
6	the dispersion relation for a proton in vacuum
7	the dispersion relation for a neutron in vacuum
8	the dispersion relation for a surface plasmon
9	the dispersion relation for a bulk plasmon
10	evanescent waves and virtual particles
11	the complex dielectric function in general
12	the complex wavevector in general
13	the complex refractive index function in general
14	the complex dielectric function in a metal
15	the complex dielectric function in a dielectric
16	the complex wavevector in a metal
17	the complex wavevector in a dielectric
18	the complex refractive index function in a metal
19	the complex refractive index function in a dielectric

Physics is about much more than equations---it is about ideas !!! Mathematics is the language that allows us to express those ideas in a compact, precise form. Some ideas require both the language of mathematics and the language of people to express them---quantum mechanics certainly does. Other ideas can be expressed using only words and pictures---because people intuitively understand the math.

I want you to understand the physics of the experiments, which to me means being able to express it in words, in pictures, and in equations. Rutherford said that if you really understand something you should be able to explain it to your grandmother. I am not asking you to explain the physics in a way that your grandmother would understand it. Just explain it so that I know that you understand it.

For each of the topics on the next page, write clear, concise, physical descriptions that demonstrate you really understand the important the physics of the experiments. You should be able to do this in a few sentences to a paragraph for each topic.

Explain the physics for each topic in your own words. You do not have to write a perfect essay on each topic, but do write enough to convince me that you really do understand the topic. Make sure to include any important pictures, graphs, and equations.

Try to write down, or draw, three or four important things for each topic.

All I want is for you to understand the physics. I am asking you to write things down because I know you will learn more that way.

If you would rather make a video or a video game, or to write a play, a poem, or a song, No Problem!
Just make sure that your opera magna show me that you understand the physics.