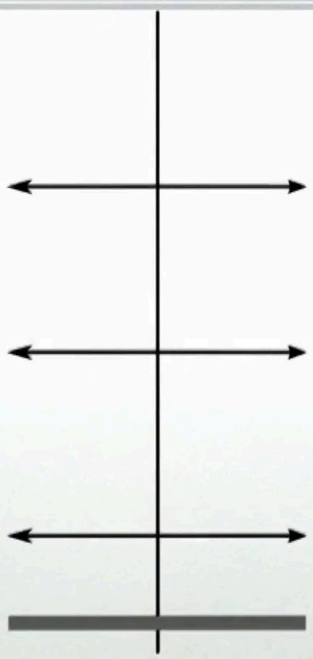
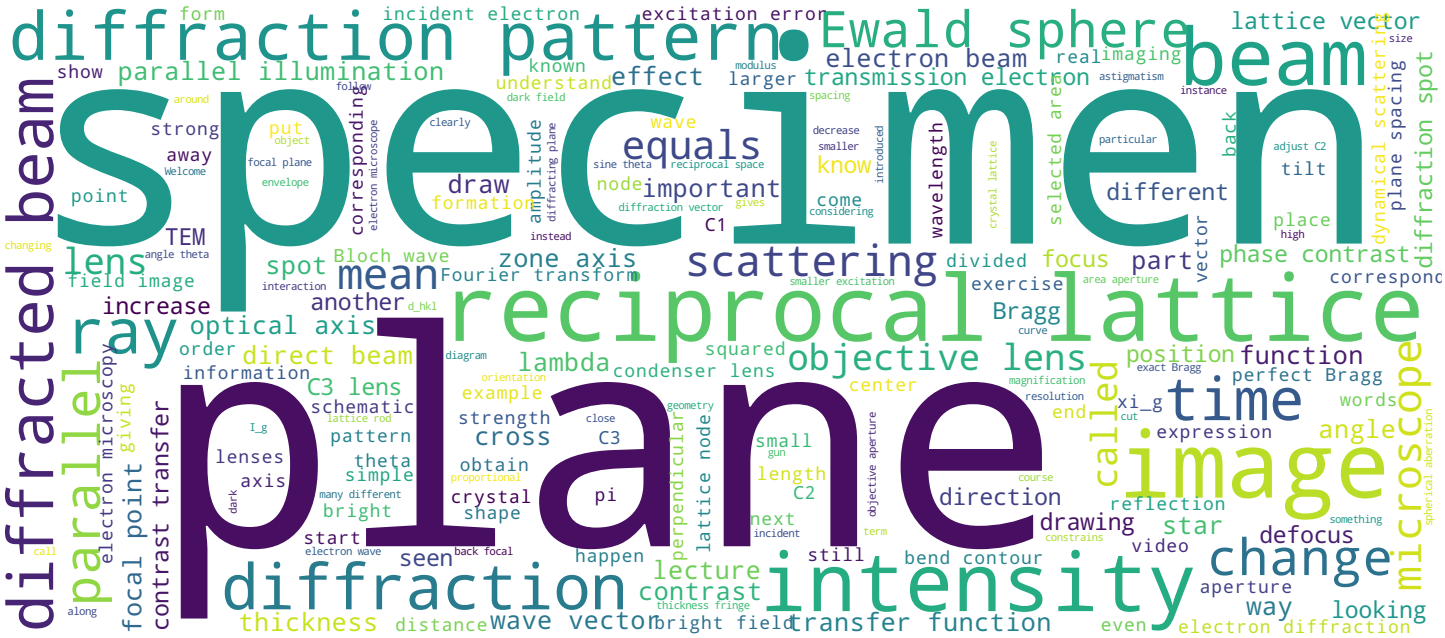
The condenser system : quizz

A typical TEM: Jeol 200cx



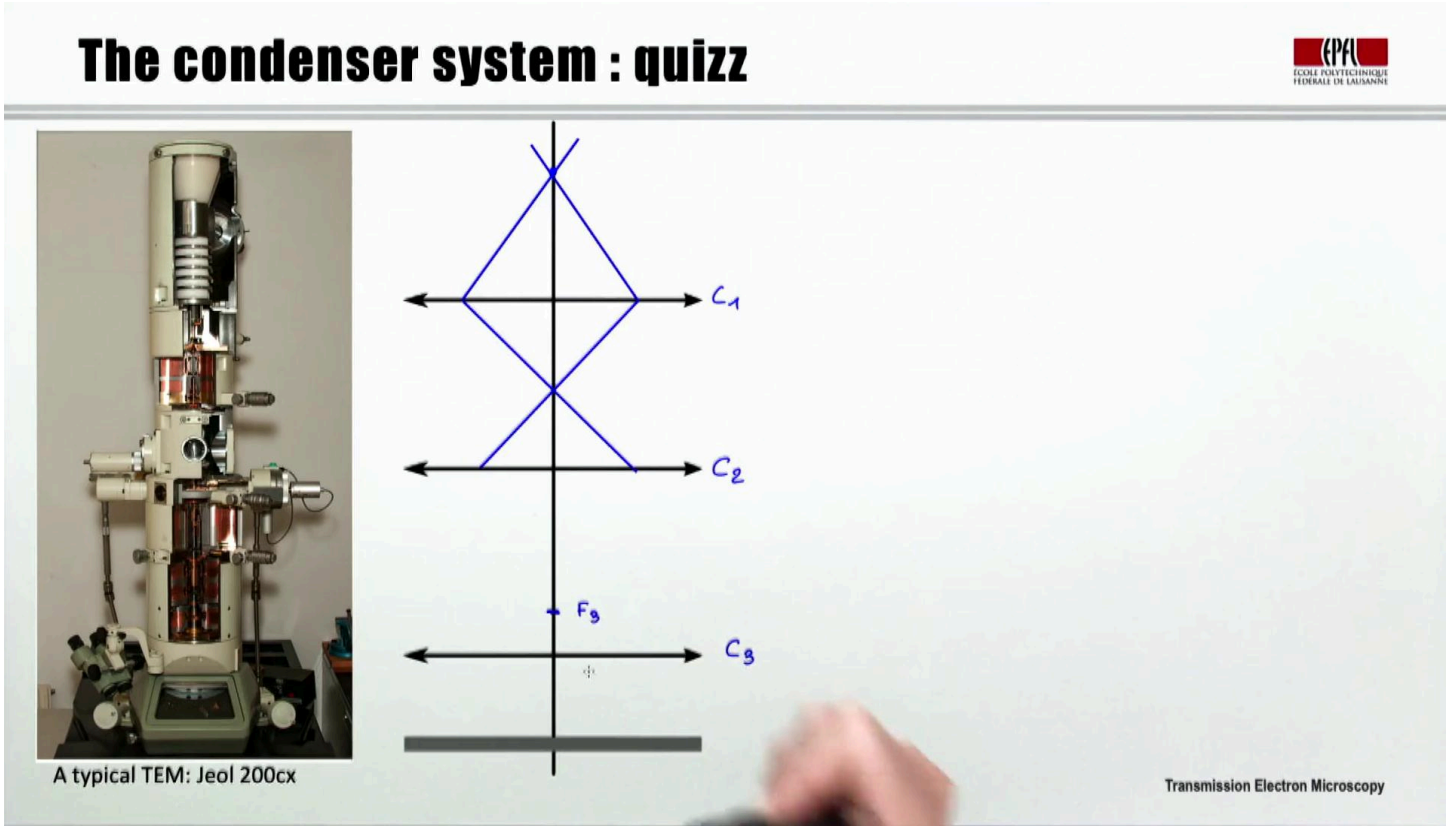
Transmission Electron Microscopy



Search MOOC

Video

EPFL

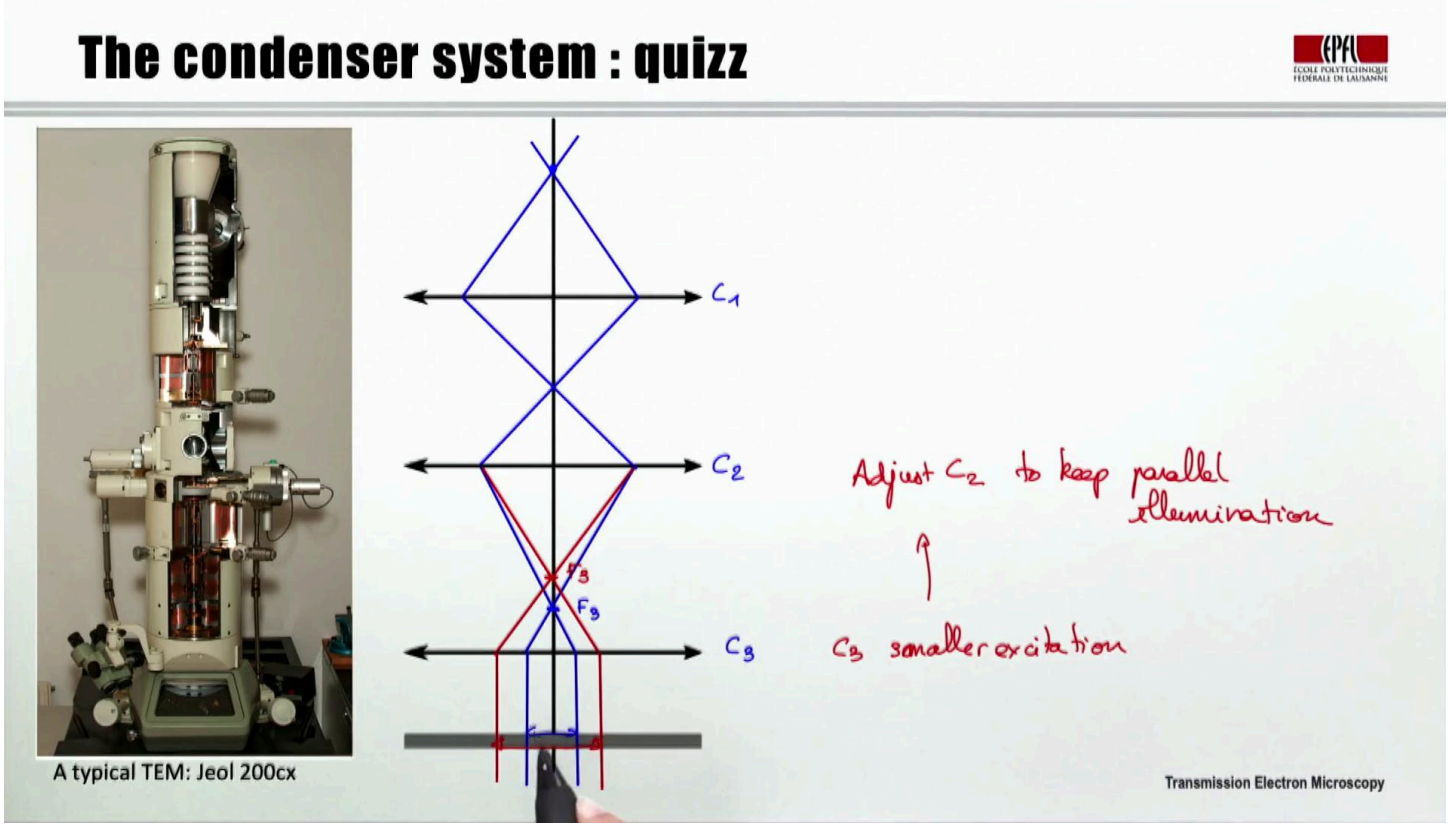


In this video, you will figure out by yourself what is going on in the three condenser lens system. Okay, I told you this two condenser lens system is the simplest one. In most of the modern microscopes we have a three condenser lens system. It is very important, for example if you want to have a parallel illumination on your specimen, that means if you want to have your beam of electrons coming altogether parallel on the specimen. So, here is your exercise. You have to redo this drawing on a piece of paper and then try to draw the schematic and explain at which place you have to put the cross-over of the C2 lens in such a way that the C3 lens will produce a parallel illumination on your specimen. So the constrains are two fold. First of all we have the cross-over produced by the gun which is then imaged by C1. Since we are not allowed to change the strength of C1, the position of the cross-over after C1 and before C2 is fixed. The second constraint that we have, and this is a very important one, is that we want to have a beam making a parallel illumination on the specimen, something like this will happen when you have all your electrons passing through the front focal point of the C3 lens.

Notes

Summary

0m 00s



That means that I have to make sure that the cross-over of C2 exactly matches this focal point of the C3 lens and then the ray will exit the C3 lens parallel to the optical axis and I will have a parallel illumination on my specimen. Okay, so now I have a second exercise for you. What happens now to my parallel illumination if I first decrease the strength of C3? So now I have C3 with a smaller excitation and I adjust C2 in order to still have parallel illumination. Okay, take another colour and draw this on the same drawing. The constrains that I have C3 at a smaller excitation tells me that the focal lens of C3 is now larger, therefore the focal point F3 has moved upwards the optical axis. I still have to adjust C2 in a way that the rays pass now to the new F3 which means that I have to increase the excitation of C2, this adjustment is an increase of the excitation. At the end, the rays are passing through F3, they will exit C3 parallel to the optical axis, and the final effect is that I have a parallel beam on the specimen with a larger diameter than I had before.

Notes

Summary

2m 00s