

**SCATTERING: ELASTIC**

Chairman: P. Debye

## Introductory Remarks

P. Debye

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Since Dr. Montroll will not talk, I will take the opportunity to speak two minutes to give you my conception of what he would have said. I think he would have said that, if you want to look at what radiation is going to do when it falls on a medium with irregular fluctuations, you have to characterize these fluctuations first in a phenomenological way. He would have started (don't believe what I say; this is only my conception) by characterizing these fluctuations by a correlation function. Then he would have insisted that this correlation function has to be a correlation function in space as well as in time. Then he would have said that from this correlation function you can calculate the intensity of the scattered radiation directly by a simple Fourier transformation. Then he would have said that you have to look at two things in the intensity distribution. First, how is the intensity distributed over the angles? This geometrical feature of the intensity gives you an opportunity to characterize a length. Then he would have said that you can also make a spectral investigation of the scattered light, which would be characteristic for time correlations. Then he would have said that this is characterized by a correlation time or by a

relaxation time, if you want to call it that way depending on the circumstances. This would be completely phenomenological.

I was prepared to tell him that this is a linear theory, which you generally call a Born approximation. If you come in the neighborhood of the critical point, the correlations become bigger and bigger and bigger, so that probably your linear theory will not work anymore. If you want to tell something about the angular distribution of the frequency distribution of the scattered radiation derived from actual observations, you have to introduce the right theory. The linear theory may not be correct at the critical point, because you get such big fluctuations. So I had hoped to induce him to say something about the second approximation and about what we are going to see there at least in a qualitative way.

Now, this is, of course, a phenomenological background. If you want to know anything about your correlation function, you have to build that upon a molecular theory. I hope that we will hear something about this molecular background. What about it, Dr. Fisher? From you?