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Evidence that a Reference System is Surrounding the Earth, as Well as any Other Mass

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Abstract: ***We examine the associated wave of the electron, and we put in evidence the problem with its relative velocity. The velocity of the electron is always measured relative to the laboratory, which gives the correct behaviour of the electron concerning the law of Louis de Broglie. But, to agree with this law, there must exist some interaction between the electron and the laboratory, which allows the electron to modify its characteristics. The electron must therefore interact with a media connected to the laboratory. Such a media must be associated with the earth, following it in its path through the Universe.***

Keywords: earth reference frame, associated wave, Low Energy Electron Diffraction

1. Introduction

We will examine an electron in constant linear movement, such an electron has an associated wave, which follows the law of Louis de Broglie.

$$m_e v\lambda = h$$

.

The problem we pose is; the velocity, in this equation, is relative to what?
It is first necessary to find a way to make a sufficiently precise measurement of the wave length, before discussing the velocity of the electron. For this purpose we use the results from X-ray diffraction experiments, which measure the mean position of the atoms in a crystal.

The wavelength of a photon is

$$\label{2} E = h \nu \Rightarrow \lambda = {{hc}\over E}$$

.

We then use Bragg's law

$$n\lambda = 2dsin\theta$$

.

where *d* is the distance between atomic layers and *n* is the number of wavelength.

The photon's velocity is much higher than the difference of velocity between the earth and an eventual surrounding media, i.e., any such relative velocity can be neglected, considering the precision of the result obtained. If we direct an X-ray beam versus a crystal, we obtain Bragg's reflection (see fig. [f1]). We can then calculate the distance between

atoms, in a crystal, with a relative error of around $10^{-}5$, which is a precision much higher then needed for our reasoning.

2. Electron Diffraction

We are interested in the Low Energy Electron Diffraction (LEED), since the velocity of the electron beam is in the same order, as an eventual relative velocity between the earth and a surrounding media.

Let us imagine an electron beam, with a non relativistic

velocity (let's say 10^6 m/s), directed versus a crystal, such electrons give also a Bragg's reflection (see fig. [f1]). The electron's associated wavelength is comparable with the distance between the atoms in a crystal.

The picture obtained from such experiments are symmetric, as presented in figure [f2], giving identical results, independent from position (direction) of the experimental apparatus or time of experiment. The electron beams velocity is around $1 \ 10^6 \ {m\over s}$, compared to the earth velocity relative to the Universal system of reference of the Cosmic Microwave Background Radiation, which is around $0.37 \ 10^6 \ {m\over s}$. This means that if we believe that the electrons velocity should be relative to a media (aether), we would expect that such pictures to be asymmetric or irregular, but, this is not the case!?

Let us imagine a laboratory, having a heavy ion source, making the following experiment. You chose an ion having a strong β− decay, and you give it a velocity v_i. You then select the decaying β− electrons with low energy and velocity v_e (around 106 m/s), in the forward direction. There should also be install a LEED detector along the beam line.

The question to answer is: Which wave length, of the electrons associated wave, will the LEED experiment show? The law of Louis de Broglie must be valid but, in which system of reference?

In the heavy ions system of reference; the electron's velocity is $v_e - v_i$ and the electrons wave length should be

$$\label{4} \lambda = {h\over{m(v_e-v_i)}}$$
In the laboratories system of reference, we obtain
$$\label{5} \lambda = {h\over{mv_e}}$$

Remember that this is non relativistic, there is no speed close to the light speed, all relativistic modifications can be neglected!

Any (non relativistic) observer must conclude that the electrons have an associated wave with a wave length comparable with the distance between the atoms in the crystal (extracted from the LEED experiment). But, this would, in the system of the ion, disagree with the law of L. de Broglie ([1]) (remember that this is not relativistic)! This law is therefore valid only in the laboratory reference frame!

This means that the electron obtains its wavelength from the surrounding space in some, not well defined, interaction. We can consider some other reasons

- The different installations of LEED measurements should show some difference in the wave length of the electrons. Necessary since there are different ways to obtain the right energy, acceleration or deceleration of the electrons, this should give noticeable difference in the measurements, which is not the case.
- An electron, within an atom, can be excited or de-excited, but, it always obtain the correct associated wave, without being absorbed and re-created. This is why the energy levels have fixed values.
- The electron is known to be a very small spherical particle, without structure. Its associated wave must therefore be due to a transverse oscillation of some sort. Now, if you accelerate such a particle, in the sense of its velocity, the transverse oscillation should be unchanged, i.e., the frequency of oscillation should be constant, independent from the acceleration. Since this is not the case, there must be some interaction with the surrounding, to explain the law of Louis de Broglie.

We can conclude saying any laboratory, on any planet in the Universe; will measure the same velocity, doing the same experiment. But, then **every mass must have a local neutral potential surrounding it.**

3. Conclusion

Examining the associated wave of the electron, we show that there is a local reference frame, centred on the earth, i.e., some sort of neutral potential, following the earth in its movement through space. This is the reference system for the electron's associated wave, and therefore for all particles with an associated wave. All masses within the Universe must then have a similar neutral potential. This potential is very likely associated with the gravitation!

The media of this neutral potential is **not** following the rotation of the earth!

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