Evidence of a neutral potential surrounding the earth.

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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.

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.

$$m_e v \lambda = h \tag{1}$$

.

The problem we pose is; the velocity, in this equation, is relative to what?
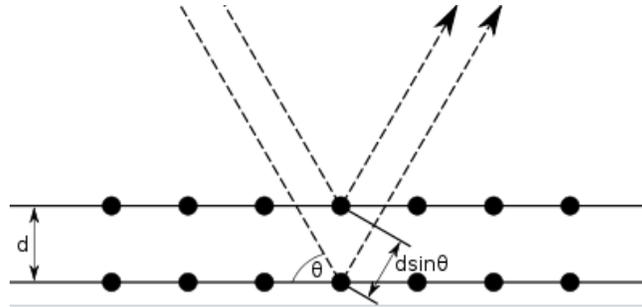
It is first necessary to find a way to make a sufficiently precise measurement of the wave length, before discussing the velocity of the electron. For this purpose we use the results from X-ray diffraction experiments, which measure the mean position of the atoms in a crystal[1].

The wavelength of a photon is

$$E = h\nu \Rightarrow \lambda = \frac{hc}{E} \tag{2}$$

.

We then use Bragg's law[2]

$$n\lambda = 2d \sin \theta \tag{3}$$

Bragg diffraction. Two beams with identical wavelength and
phase approach a crystalline solid and are scattered off two
different atoms within it. The lower beam traverses an extra
length of 2$d$sinθ. Constructive interference occurs when this
length is equal to an integer multiple of the wavelength of the
radiation.

[3]

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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. 1). 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)[4], 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. 1). 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 2, giving identical results, independent from position (direction) of the experimental apparatus or time of experiment. The electron beams velocity is around $1\ 10^6\ \frac{m}{s}$, compared to the earth velocity relative to the Universal system of reference of the Cosmic Microwave Background Radiation, which is around $0.37\ 10^6\ \frac{m}{s}$. This means that if we believe that the electrons velocity should be relative to a media (aether), we would expect that such pictures should 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 10^6 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 electrons wave length should be

$$\lambda = \frac{h}{m(v_e - v_i)} \tag{4}$$

while, in the laboratories system of reference, it should be

$$\lambda = \frac{h}{mv_e} \tag{5}$$

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[5] experiment). But, this would, in the system of the ion, disagree with the law in equation (1) (remember that this is not relativistic)!

There are two possible solutions:

- The system of the heavy ion (emitting the electron) is correct, i.e. the equation (1) is valid for the heavy ion system but not for the laboratory system. This means that the electron obtain its wavelength at the moment of the β^- decay.

- The system of the laboratory is correct but not the system of the heavy ion. This means that the electron obtain its wavelength from the surrounding space in some, not well defined, interaction.

The second possibility must be correct, mainly for three 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, which should give noticeable difference in the measurements, this 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.
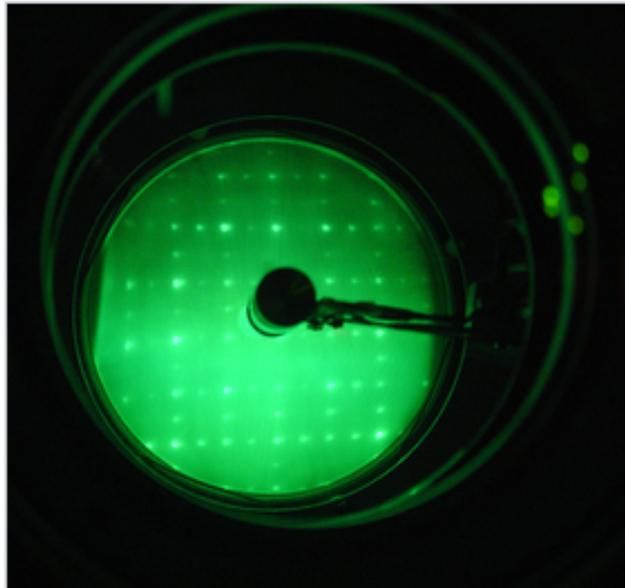
Figure 1: LEED pattern of a Si(100) reconstructed surface. The underlying lattice is a square lattice while the surface reconstruction has a 2×1 periodicity. As discussed in the text, the pattern shows that reconstruction exists in symmetrically equivalent domains which are oriented along different crystallographic axes. The diffraction spots are generated by acceleration of elastically scattered electrons onto a hemispherical fluorescent screen. Also seen is the electron gun which generates the primary electron beam. It covers up parts of the screen.

[4]

- The electron is known to be a very small spherical particle, without structure[6]. 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 that if the associated wave is correct relative to the laboratory then, **any laboratory, on any planet in the Universe, will measure the same relative velocity, which means that every mass has a local neutral potentia surrounding it.**

3 New hypothesis of a media dragged by the mass of the earth

To get a better understanding of such a local reference system, it is interesting to read about the historical experiments and theories of aether and aether dragging, a resume with a collection of pertinent references can be found in[7].

First, as shown above, there is a media following the earth in its path through the Universe. Secondary, this media do not rotate with the earth, as demonstrated with the Michelson–Gale–Pearson experiment[8] [9].

This would explain all experimental results besides the stellar aberration[10], but this can be explained in the following way.

3.1 Stellar aberration

In stellar aberration the position of a star, when viewed with a telescope, swings to each side of a central position by about 20.5 seconds of arc every six months. This amount of swing is the amount expected when considering the speed of earth's travel in its orbit. It seems that if the aether drag hypothesis were true then stellar aberration would not occur because the light would be travelling in the aether which would be moving along with the telescope.

The amount of stellar aberration, α, is given by:

$$\tan \alpha = \frac{v}{c} \tag{6}$$

The speed at which the earth goes round the sun, v = 30 km/s, and the speed of light is c = 299,792,458 m/s which gives α = 20.5 seconds of arc every six months. This amount of aberration is observed.

A neutral potential around each mass means that; the earth "bubble" is inside the suns "bubble" which in its turn is inside the galaxy's "bubble" et c.. But, when a photon goes from one "bubble" to another there is a problem, at
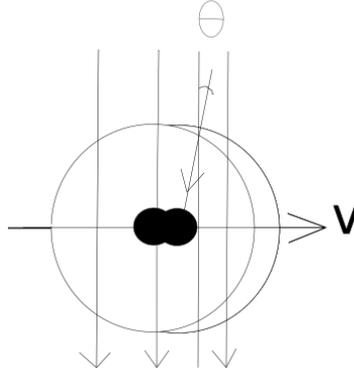
Figure 1: Scenario of stellar aberration

the interface where the photon enters the "media bubble" dragged by the earth. Here, the photon have a longitudinal velocity c plus a transverse velocity v_{earth}, which means that its total velocity would be above the limit c!? To avoid this problem, the photon must deviate its path, so that its velocity remains constant, this can be done if the photon deviates in the opposite direction relative to the transverse media drag (see fig. 1), so that its trajectory remains straight at a constant speed. But this means that, in the earth reference system the photon obtains an angle, corresponding exactly to the stellar aberration. While, seen from the sun's "bubble" the photon continues straight on!

4 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 sustem 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!

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

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