Diffraction Experiment of Microscopic Particle Is Due to One Force[1]

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Abstract

It will be considered that microscopic particle does not have wave nature, diffraction experiment of microscopic particle should indirectly and objectively reflect the existence of one force which can lead to particle’s diffraction phenomenon, the force belongs to deeper theory under the quantum mechanics, and will be proved that it relates to electrostatic force in this paper.

Introduction

It is a basic judgment that microscopic particle also is wave because which has diffraction phenomenon, the wave of microscopic particle be interpreted as probability wave in Born’s paper[2]. Probability Wave means that the states of microcosmic particle can’t be accurately predicted and it is only described by probability in theory; on the contrary, if accurate prediction is demanded in theory[3], the only way is to assume that microcosmic particle does not have wave nature.

On the one hand, diffraction experiment indicates microcosmic particle with the property of wave; on the other hand, the theory requires that microcosmic particle does not have wave nature. it is extreme contradiction between experiment and requirements in theory, one way out of the difficulty is to assume that wave nature is not actual for microscopic particle.
The following discussion, It will be proved firstly that
diffraction experiment does not demonstrate microcosmic particle
with wave nature 100 percent; Secondly, it will be proved wave
phenomenon of microcosmic particle is due to one force.

1 **Diffraction Experiment Can’t Demonstrate That Microcosmic
Particle Has Wave Nature**

All wave have diffraction phenomena in classical physics, so
it is taken for granted that microcosmic particle also is wave, but
no theory directly proves it in fact, also diffraction phenomena of
microcosmic particle is not completely equivalent to wave nature,
it can be proved by two thought experiments.

Diffraction experiment of microcosmic particle bases on a
large number of particles or many experiments of a single particle,
imagining a lot of foraging ants on the ground, the distribution of
ants must follow the rules that ants abound in the place where food
abound, image of ants on the ground is similar to the stripe of
diffraction phenomenon (bright area in the place where more ants,
dark area in the place where little ants); it obeys the law of
probability distribution if we use statistical analysis, a higher
probability for ants in the place where has food and is closer to
food. Ants have diffraction phenomenon and can be described by
probability, but we can’t think that ants with wave nature of
probability, wave phenomenon of ants is due to the “temptation”
of food, while wave phenomenon of ants will don’t occur once the
temptation disappearance, this means that the wave phenomenon
of ants reflects the existence of temptation.

It also can be interpreted by another thought experiment,
assuming one train with speed of 350 kilometers per hour, people
has this speed if we by the train, people has the speed of train but
we can’t think that people also is train, it can only show that the
train has influence on people.
2 Giving the Force and Getting the Energy of Hydrogen Atom

Wave nature of microcosmic particle does not allow obviously in this paper, the only way to understand diffraction phenomenon is that the motion states of particle change regularly when they pass through the diffracting object, the change is due to interaction of one force.

The existence of additional force has indicated in quantum mechanics, quantum potential energy has been proposed in Bohm’s paper[4] by analysis Schrodinger equation, it relates to wave function and has the form

\[ V = -\frac{\hbar^2}{2m} \frac{\nabla^2 \psi}{\psi} \]  \hspace{1cm} (2.1)

the potential energy of object be calculated by work in conservation field of force, so quantum potential energy accompanies corresponding force, has

\[ f = f\left( \frac{\partial V}{\partial r} \right) = f\left( -\frac{\hbar^2}{2m} \frac{\partial}{\partial r} \left[ \frac{\nabla^2 \psi}{\psi} \right] \right) \]  \hspace{1cm} (2.2)

where \( r \) is the distance of two particles, the complete force of particle should has the form

\[ F = f\left( -\frac{\hbar^2}{2m} \frac{\partial}{\partial r} \left[ \frac{\nabla^2 \psi}{\psi} \right] \right) + f\left( \frac{\partial U}{\partial r} \right) \]  \hspace{1cm} (2.3)

where \( U \) is the potential which usually has been given in Schrodinger equation.

The force be found in my book the Handwriting of Quantum, and has function form

\[ F = D2\sin\left( \pi \sqrt{r/A} \right)S\left( \pi \sqrt{r/A} \right)[S^2\left( \pi \sqrt{r/A} \right)-(\pi/2)^2] \]  \hspace{1cm} (2.4)

where \( S(x) = \int_0^r \frac{\sin x}{x} dx \), \( r \) is the distance between two research objects, \( A \) and \( D \) relate to investigate system (where \( A > 0 \)). The force has unique property which forms many potential wells in \( r = n^2 A \) (where \( n = 1, 2, 3, ... \)), in other words: \( r = n^2 A \) is an energy level. particle only has potential energy but has no kinetic energy if the particle is in the bottom of a well, defining zero potential energy in \( r \to \infty \), so potential energy has the form
\[ U = -D \left( s \sqrt{r / A} - \left( \pi / 2 \right)^2 \right) \]  

(2.5)

The calculation results show that \( U_{r=n^2, A} \approx -D / n^2 A \) (refers to table 1.1), \( U_{r=n^2, A} \) also represents the energy of a hydrogen atom when \( D / A = \frac{m e^2}{32 \hbar^2 c R} \), this strongly indicates that \( F \) is the direct reason of quantization in microcosmic field.

**Table 1.1**  the calculation of \( U_{r=n^2, A} \) and \( 1 / n^2 A \)  
(where make \( A=1 \) and \( D=1 \))

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3 Electrostatic Force and Gravity Also Have Accurate Form

We still use the opinion that the potential energy of object calculates by work in conservation field of force, it can be regarded as the work by a constant force $\overline{F}$ when particle from $n$ to $n-1$ energy level, has

$$\overline{F} = \frac{U_n - U_{n-1}}{n^2 \mathcal{A}^n - (n-1)^2 \mathcal{A}^{n-1}} = -\frac{D}{n^2 \mathcal{A}^n} \tag{3.1}$$

$n^2 \mathcal{A}$ is similar to continuous change if $\mathcal{A}$ is small enough, using continuum variable $r$ instead of $n^2 \mathcal{A}$, has

$$\overline{F} = -\frac{D}{r^2} \tag{3.2}$$

it is strict same with the electrostatic force, so electrostatic force should has more accurate form

$$F = KQ_i Q_j \frac{2 \sin(\pi \sqrt{r/A})S(\pi \sqrt{r/A})[S^2(\pi \sqrt{r/A})-(\pi/2)^2]}{r} \tag{3.3}$$

where $K$ is the constant of electrostatic force, $r$ is the distance of object 1 and 2, $Q_i$ and $Q_j$ are charge of object 1 and 2, $A$ is defined as the radius of electrostatic force in here.

I suppose that gravity also has the similar accurate form

$$F = -GM_1 M_2 \frac{2 \sin(\pi \sqrt{r/B})S(\pi \sqrt{r/B})[S^2(\pi \sqrt{r/B})-(\pi/2)^2]}{r} \tag{3.4}$$

where $G$ is the constant of gravity, $r$ also is the distance of object 1 and 2, $M_1$ and $M_2$ are mass of object 1 and 2, $B$ is defined as the radius of gravity in here.