Understanding Quantum Mechanics by Sequential Stern-Gerlach Experiments (Outline)

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Abstract

In this essay, we apply the quantum measure theory to interperate the results of sequential Stern-Gerlach (SG) experients, which deepens our understanding of the quantum mechanics.

1 Introduction

The original SG experiment was given by A and B in some years, which proved the existence of spin. The experimental setup is as shown in Fig. 1. A beam of Sliver are heated in the oven and then pass through..., ... Surprisely, the beams in the screen is not continues as predicted by classical physics, but discritly separated into two branches. The result also can be viewd as one of the simplest quantum system, a two level energy system.

J.J. Sakurai extented the original SG experiment to the sequential ones to illustrate the essential of quantum mechanics. Here we follow the Sakurai's discussion in [1] to demostrate and understand the quantum mechanics itself.

2 Methods

2.1 Sequential SG experiments

2.2 Quantum measurement theory

Now let us apply the quantum measurement theory to calculate the outcomes from the sequential SG experiments. ...

3 Results

The calculation is consisted with the results from SG experients. ...

4 Conclusion

The result shows that the results of SG can be calculated and predicted in then framework of quantum mechanics. The quantum mechanics analysis of the SG Experiments enhances our believe of the theory.

Figure 1: Sunrise, Claude Monet, 1872

5 Appendix

5.1 Details about the original SG experiment

5.2 Analogy with light polarization

5.3 Hilbert space and Dirac notation

References

[1] J. J. Sakurai. *Modern quantum mechanics*. Addison-Wesley Pub. Co, Reading, Mass, 1994.