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The weak measurement process and the weak value of spin for metastable helium 23S1

We are performing an experiment to measure the weak value of spin for non-zero mass particles that obey Schrödinger's equation. The principle of the weak measurement was first proposed by Aharonov, Albert and Vaidman ^[1]. The experimental method is thoroughly discussed in Duck, Stevenson and Sudarshan ^[2]. The weak measurement process allows us to better understand quantum mechanical processes, aspects include the ability to amplify small signals, explore the wave function and develop new experimental techniques. The experiment will use a pulsed supersonic beam of spin-1 metastable Helium atoms in the 23S1 triplet state, with 20 eV internal energy and a long lifetime of 7870(510) s ^[3]. During its flight the atomic beam will travel through two magnets (weak and strong) which both comprise the weak measurement process. Finally the atoms will be detected on a micro-channel plate detector coupled to a phosphorus screen and CCD camera. We will report on the method and its experimental realization.

References

- [1] Yakir Aharonov, David Z. Albert, and Lev Vaidman. Phys. Rev. Lett 60, 1351 1354 (1988)
- [2] I. M. Duck, P. M. Stevenson, and E. C. G. Sudarshan. Phys. Rev. D 40, 2112 2117 (1989)
- [3] S. S. Hodgman, R. G. Dall, L. J. Byron, K. G. H. Baldwin, S. J. Buckman, and A. G. Truscott. Phys. Rev. Lett. 103, 053002 (2009)

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