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Quantum Interpretation of the Nucleon Anomalous Magnetic Moment

Content :

A century's proliferation of Quantum Interpretations[1] has been driven by an incomplete understanding of the measurement problem[2], by an incomplete understanding of the unobservable wavefunction and its unobservable interactions. Yet it remains that the observer effect - observing a phenomenon necessarily changes that phenomenon - is at the historical foundation of quantum mechanics. The semantic confusion, that wavefunction interactions are unobservable yet the observer effect is irrefutable, can be resolved by considering the difference between simple passive measurement and active transfer function measurement. In the first, one registers whatever lump of energy lands upon a sensor, and there is no observer effect. In the second, one excites the system of interest and measures the response, and there is an observer effect[3]. Magnetic moment measurements are transfer function measurements. To measure an amplitude one must align the spin, applying a magnetic field to separate the energy eigenstates, and excite the system to measure their difference. A paper presented to Spin 2016 [4] suggests that the measured anomaly is not an intrinsic property of the fermionic proton, but rather an observer effect. In our presentation to Spin 2018 [5] we propose to extend the Spin 2016 interpretation to the neutron anomalous moment[6].

* michaele.suisse@gmail.com

[1]https://en.wikipedia.org/wiki/Interpretations_of_quantum_mechanics
[2]P. Busch and P. Lahti, "Measurement Theory", in Compendium of Quantum Physics, p.374-379 Springer (2009).
[3]see also the statements of Heisenberg, Bell, and Feynman in the references of https://en.wikipedia.org/wiki/Observer_effect_(physics)
[4]M. Suisse and P. Cameron, "Quantum Interpretation of the Proton Anomalous Magnetic Moment" in Proceedings of 22nd International Spin Symposium, Urbana Champaign (2016). As of this writing the proceedings have not yet appeared. The poster may be found here http://vixra.org/abs/1609.0422 and the companion video here https://www.youtube.com/watch?v=uyM4cZgSprI=19s
[5]http://spin2018.unife.it/
[6]P. Cameron, "Neutron Spin Structure, Yang-Mills Theory, and the Mass Gap", abstract submitted to Spin 2018.

Primary authors : Ms. SUISSE, Michaele (Independent Researcher)

Co-authors : CAMERON, Peter (Independent Researcher)

Presenter : Ms. SUISSE, Michaele (Independent Researcher)

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