Mass Charge Interactions for Visualizing the Quantum Field

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Abstract. Our goal in this work is to explore the possibility of integrating the objective and subjective aspects of our personal experience into a single complete theory of physical reality. To further this endeavor we examine the possibility of replacing point particles with elementary events as the building blocks of a process oriented description of that reality. The simplest event in such a conception is an adaptation of A. Wheeler's primitive explanatory/measurement cycle between internal observations experienced by an observer and their assumed physical causes. We will show how internal forces between charge and mass are required to complete the cycle as a double (Fermion spin ½) sequence of activity. This new formulation of internal material, though related to Vigier's Tight Bound States or the structure of quarks, is easier to visualize and map to cognitive experiences than current sub-atomic physics. In our formulation, called Cognitive Action Theory, such internal forces balance the external forces of gravity-inertia and electricity-magnetism. They thereby accommodate outside influences by adjusting the internal structure of material from which all things are composed. Such accommodation is interpreted as the physical implementation of a model of the external physical world in the brain of a cognitive being or alternatively the response mechanism to external influences in the material of inanimate objects. We adopt the de Broglie-Bohm causal interpretation of QT to show that the nature of space in our model is mathematically equivalent to a field of clocks. Within this field small oscillations form de Broglie waves. This interpretation allows us to visualize the underlying structure of empty space with a charge-mass separation field in equilibrium, and objects appearing in empty space with quantum wave disturbances to that equilibrium occurring inside material. Space is thereby associated with the internal structure of material and quantum mechanics is shown to be, paraphrasing Heisenberg, the physics of the material that knows the world.

Key Words: measurement explanation cycle, cognitive action theory, mind-body problem, structure of space, interpretations of quantum theory, charge-mass separation

Biography: Dr. Wolfgang Baer received his Ph.D. in Physics from the UC Berkeley. He started a computer graphics development company, has run a multi million dollar simulation laboratory for the US Army at Ft. Ord California, and held a research position at the Naval Postgraduate School in Monterey California, teaching courses in network programming and quantum information systems. Dr. Baer developed programs for unmanned aerial vehicles cognitive vision interpretation. His interest in cognitive brain functions has lead to publications exploring the physics of consciousness, real intelligence, and research applications directed toward the extension of cognitive brain capability beyond its normal limits.