" Quantum Reasoning about Sequences of Events"

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There is a substantial and accumulating body of empirical evidence from human judgment and decision experiments supporting the idea that it is useful to characterize some types of measurements taken on human cognitive systems as *incompatible* in the quantum theoretical sense. As the physicist Robert Griffiths pointed out, incompatibility is the mathematical feature of quantum theory that differs most from classic theory "the relationship of incompatibility means that the properties cannot be logically compared, a situation which does not arise classic physics." As a consequence, according to Griffiths, quantum theory allows for many incompatible descriptions that cannot be combined, and when constructing descriptions of sequences of events, it is necessary to restrict oneself to a *consistent* framework. Essentially, a consistent framework is a mutually exclusive and exhaustive decomposition of the sample space of histories into elementary histories that also satisfies an additional constraint – the Boolean algebra of events generated by the elementary histories must satisfy a *consistent history* property -- the probability of the union of two mutually exclusive events *must* equal the sum of the individual probabilities. Surprisingly, in quantum theory, the consistent history property is NOT always satisfied even when the events are mutually exclusive. The purpose of this talk is to examine the implications of the single consistent history framework requirement for describing properties (judgments and or decisions) of the human cognitive system across time. A psychological example will be used to illustrate these concepts, which is based on our previous research demonstrating interference type of effects in a categorization – decision experiment.