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The Afshar Experiment and Complementarity RUTH KASTNER, University of Maryland, College Park — A modified version of Young's experiment by Shahriar Afshar demonstrates that, prior to what appears to be a "which-way" measurement, an interference pattern exists. Afshar has claimed that this result constitutes a violation of the Principle of Complementarity. This paper discusses the implications of this experiment and considers how Cramer's Transactional Interpretation easily accomodates the result. It is also shown that the Afshar experiment is isomorphic in key respects to a spin one-half particle prepared as "spin up along x" and post- selected in a specific state of spin along z. The terminology "which way" or "which-slit" is critiqued; it is argued that this usage by both Afshar and his critics is misleading and has contributed to confusion surrounding the interpretation of the experiment. Nevertheless, it is concluded that Bohr would have had no more problem accounting for the Afshar result than he would in accounting for the aforementioned pre- and post- selection spin experiment, in which the particle's preparation state is confirmed by a nondestructive measurement prior to post-selection. In addition, some new inferences about the interpretation of delayed choice experiments are drawn from the analysis.

Ruth Kastner
University of Maryland, College Park

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