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IS IT POSSIBLE TO BELIEVE IN BOTH ORTHODOX
QUANTUM THEORY AND HISTORY? *

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THE PROBLEM OF HISTORY

In a recent conference at Oviedo in Spain, Roland Omnes¹ introduced us to an imaginary experimentalist who is describing an experiment he has performed (fig. 1): "A neutron, produced in a reactor, *passed through the slit S*, and proceeded to an interaction region..." What, asked Omnes, does the statement in *italics* mean? Rather, perhaps, we should ask what meaning can we give to it in order that it will be a correct statement? This is a question of history, which is very much a fashion in quantum theory these days^{2,3,4,5}, and which is appropriate in the wonderful surroundings in which we are privileged to be holding this conference. It is also an instructive thing to discuss in the context of trying to understand quantum theory. In such a context we often talk about the future, where we can ask what happens if we "do something" (e.g., measure), without being very clear about what it is that we do. In discussing the past, we do not have such a damaging⁶ option. So, in this talk we shall ask:

Is the statement that the neutron went through *S* true?

Can we give it a meaning so as to make it true?

What are the implications of such a meaning for other ideas about history?

Figure 1. Showing how a neutron, produced in a reactor, passes through a slit, *S*, and is seen in an experiment, *P*.

* Invited talk at the conference "Frontiers of Fundamental Physics" held at Olympia, Greece, 1993, to be published in the Proceedings.