

The Birth of Philosophy of Physics and the Origin of Quantum Propensities: Henry Margenau's 'Latency' School

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Abstract:

Quantum propensities were popularised by Karl Popper in the 1960's. Popper's attempt to solve the quantum paradoxes is notoriously deficient, and has been by and large abandoned by physicists and philosophers alike. It is not widely known, however, that a similar approach that historically preceded Popper's is much more on the right track.

In this paper I undertake the first detailed historical examination of the origin of the latency concept in the works of Henry Margenau in the 1950's. Margenau was a highly influential and respected member of the theoretical physics community after the war. He was not only a prolific writer but a tireless organiser and a consummate teacher. He was also a devout advocate of the philosophy of science and physics, and did much to elevate their status among scientists and philosophers alike. In fact Margenau played a key role in establishing philosophy of physics as a discipline. He founded the journal *Foundations of Physics*, and was instrumental in setting up the Philosophy of Science Association. As the Yale Professor in Theoretical Physics he was able to attract a large number of students to the foundations and philosophy of physics over the years. Many of these students worked out the details of Margenau's own ideas, including the concept of quantum latency. There certainly was a very strong and well defined 'Margenau school' in the 1950's and 1960's.

I focus on the social and intellectual roots and influences of Margenau's latency school. Margenau himself had philosophical training; he had studied the writings of Cassirer and the Marburg school, and considered himself a Neo-Kantian. Because of his institutional role as a *mersenne* for philosophy of physics, Margenau came into regular contact with some of the most important philosophers and physicists in his time. In particular I consider Margenau's exchanges with Carnap and Heisenberg, precisely at a time when both were developing 'dispositional' accounts of quantum properties (Heisenberg) and of theoretical terms in general (Carnap). I also consider the possible influence of Margenau's school upon Popper and his followers in the 1960's – in particular I ask whether Popper's propensities may be seen as a critical rationalist response to Margenau's neo-Kantian latencies.