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**The Role and Meaning of the Energy-Time Relations** JUAN FERRET, UTEP — While the Heisenberg relation between position and momentum seems to rest on solid footing, the energy-time relation (ETUR) has yet to receive a formal mathematical treatment. The trouble for ETUR began when Pauli showed that a self-adjoint time operator does not exist. Some find this sufficient to doubt the foundational value of ETUR. In spite of this void, experimental evidence now sets the energy-time relation on solid physical grounds. The extraordinarily fast decay of resonance particles, for instance, indicates that the time indeterminacy $\Delta t$ is given by its short lifetime. The decay of the nuclei of $^{57}$Co into $^{57}$Fe gives an indeterminate width $\Delta E$ for the intermediate state of decay with lifetime $\Delta t$. Their product results in Planck's constant confirming the particular relation between energy and time. Recently there have been some theoretical attempts at circumventing Pauli's theorem and dealing with this foundational void of ETUR. Paul Busch, for instance, introduced a positive operator value (POV) measure for time that does not commute with the Hamiltonian of a system. After a brief survey of these different approaches and critiques of ETUR, I show that ETUR holds universally.

Juan Ferret
UTEP

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