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W. K. H. Panofsky Prize: The Road to Neutrino Mixing Angle θ_{13}[1]

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A series of solar, atmospheric, accelerator and reactor neutrino experiments have observed transformations of one type of neutrino to another type. This intriguing phenomenon called neutrino oscillation was predicted by Pontecorvo, Maki, Nakagawa and Sakata. It is due to the fact that the three flavors of neutrinos observed in laboratories are mixtures of three neutrino mass eigenstates. Neutrino mixing is described by a set of three mixing angles and a CP-violating phase. The smallest angle, θ_{13}, was unknown until 2012. Knowing the value of θ_{13} is essential. Besides being a fundamental parameter of nature, knowing its value will improve our understanding of neutrino mixing, provide guidance for building theoretical models and define the future program of neutrino oscillation experiments. In this talk, the experimental development that led to the recent discovery of a new θ_{13}-driven neutrino oscillation will be presented.

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