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The Origins of the Franck-Hertz Experiments CLAYTON GEARHART, St. John's University (Minnesota) — This April APS meeting marks the 100th anniversary of the experiments of James Franck and Gustav Hertz, in which they bombarded mercury atoms with slow electrons. Today, we interpret their results as confirming the existence of quantized atomic energy levels. Their own interpretation was quite different—they thought they were recording ionization, not excitation, and said not a word about Niels Bohr's new theory. Even more surprising, quantum theory had little to do with the initial motivation for their experiments. Franck, beginning with his doctoral dissertation in 1905, had been measuring ion mobilities in gases. At first, his work involved clever but hardly earthshaking extensions of Ernest Rutherford's experiments at the Cavendish Laboratory in England. But in 1910, in measuring the mobilities of argon ions, Franck made an astonishing discovery: Electrons freed from argon atoms did not immediately attach to other atoms, forming negative ions. Rather, they remained free. This discovery led Franck to question earlier theories of ionization by collision, and led him to propose to Hertz the collaboration that eventually led to the experiments on mercury. I will sketch this early history, and time permitting, talk about what if anything they knew about Bohr's theory in 1914.

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