# Testing for the Continuous Spectrum of X-Rays Predicted to Accompany the Photoejection of an Atomic Inner Shell Electron

Carl Franck, Presenter



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Echoing classical physics, quantum electrodynamics predicts the release of a spectral continuum of electromagnetic radiation upon the sudden acceleration of charged particles in quantum matter. Despite the apparent success in describing such processes in nuclear beta decay and K capture, where they are called internal Bremsstrahlung, Bergstrom and Pratt point out that the analogous situation of the photoejection of an electron from an inner shell of an atom, intraatomic Bremsstrahlung, is far from settled. In this poster we present fresh measurements which rely on contemporary signal processing as well as the high flux available from synchrotron radiation sources to revisit the problem by photoinjecting an electron from the innermost shell of copper. Thanks to a storage ring-undulator-fed source, for the first time we have sufficient photon statistics to measure the expected spectra at the level expected by contemporary theory. Furthermore, we employ sufficiently thin targets to overcome secondary scattering artifacts. Our approach applies the fluorescence coincidence method to remove extraneous scattering and multiple incident photon processes. We conclude at the two sigma level that the current theoretical approach overestimates the measured rate expected for intraatomic Bremsstrahlung in copper in the range of detected energies below the K fluorescence energy.