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This Week's Citation Classic

Garcia J D & Mack J E. Energy level and line tables for one-electron atomic spectra. J. Opt. Soc. Amer. **55**:654-85, 1965. [Dept. Physics, Univ. Wisconsin, Madison, WI]

This article presents precise one-electron energy levels and line spectra wavelengths for all elements from hydrogen to calcium. The energy level values were calculated by correcting the Dirac equation values for nuclear size and mass and quantum electrodynamic effects up to order $\alpha^5 Z^6$. [The *SCI*® indicates that this paper has been cited over 115 times since 1965.]

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"The major reason for the existence of the above publication was the late Julian E. Mack, internationally known atomic spectroscopist and one-time science at-taché to Sweden. He saw the need for updating the then available tables of accurate one-electron energy levels and wavelengths. He convinced the National Research Council's Committee on Line Spectra to sponsor the task financially and recruited someone, namely me, to do the project. I was just beginning my PhD studies at Madison, Wisconsin, at the time.

"We made every attempt to include all the then known quantum electrodynamic terms and corrections. We sought advice from a number of physicists, and were given good cooperation, including access to unpublished works and theses prior to publication, as acknowledged in the paper. The mechanics of producing the paper, which in today's terms would be called simple, were at that time somewhat difficult, requiring careful alignment of the mechanical printer, ordering of special com-puter printout paper, and accep-tance of that format by the editor of the journal of the Optical Society of America.

"Under many circumstances and at other places, such a task might have seemed tedious, boring, and of not much value to those doing it. However, the scientific at-mosphere which Julian managed to maintain in his research group at Madison during my acquaintance with him was stimulating and humanely warm. In that context, going to work each day was more like fun than work, and the students doing measurements actually cared about the numbers! For me it had special meaning because it put me in close contact with one of the finest human be-ings I have known. Despite his many contracts, contacts, and projects, Julian was never too busy to talk to students. I never got any inkling of his seeking to enhance his own status, but only a feeling of the endeavor to understand nature and of intellectual growth in a community of friends.

"The number of citations to this work is strong evidence of the need for accurate energy level lists for spectroscopic identification purposes."