



Professor Charlotte Froese Fischer

Foreign Member of the Lithuanian Academy of Sciences since 2004

Charlotte Froese Fischer is a Canadian-American applied mathematician and computer scientist who gained world recognition for the development and implementation of the Multi-Configurational Hartree–Fock(MCHF) approach to atomic-structure calculations and for her theoretical prediction concerning the existence of the negative calcium ion. For this last accomplishment, she was elected to grade of Fellow of the American Physical Society.

Early life

Charlotte Froese was born on September 21, 1929, in the village of Pravdivka (formerly Nikolayevka), in the Donetsk region, in the present-day Ukraine, to parents of Mennonite descent. Her parents immigrated to Germany in 1929 on the last train allowed to cross the border before its closure by Soviet authorities. After a few months in a refugee camp, her family was allowed to immigrate to Canada, where they eventually established themselves in Chilliwack, British Columbia.

Education and research

She obtained both a B.A. degree, with honors, in Mathematics and Chemistry and an M.A. degree in Applied Mathematics from the University of British Columbia in 1952 and 1954, respectively. She then obtained her Ph.D. in Applied Mathematics and Computing at Cambridge University in 1957, pursuing coursework in quantum theory with Paul Dirac. She worked under the supervision of Douglas Hartree, whom she assisted in programming the Electronic Delay Storage Automatic Calculator (EDSAC) for atomic-structure calculations.

She served on the mathematics faculty of the University of British Columbia from 1957 till 1968, where she introduced numerical analysis and computer courses into the curriculum and was instrumental in the formation of the Computer Science Department.

Froese Fischer spent 1963-64 at the Harvard College Observatory, where she extended her research on atomic-structure calculations. While at Harvard, she was the first woman-scientist to be awarded an Alfred P. Sloan Fellowship.

She served as Professor of Applied Analysis and Computer Science at the University of Waterloo (1968 - 75), Professor of Computer Science at Pennsylvania State University (1974 - 79). She and her husband, Patrick C. Fischer, came to Vanderbilt University in 1980.

Dr. Fischer has served as Editor for a number of journals. She served as an Atomic Structure Editor for Computer Physics Communications from 1968 - 1998.

Since then she has become internationally known for her software for atomic structure calculations and her research in atomic structure theory.

In 1991 she became a Fellow of the American Physical Society, in part for her contribution to the discovery of negative calcium. In 1995 she was elected a member of the Royal Physiographic Society in Lund, in 2004 a foreign member of the Lithuanian Academy of Sciences and in 2015 she was awarded an Honorary Doctorate in Technology from Malmö University, Sweden.

She is the author of over 300 research articles on computational atomic theory, many of which have had far-reaching impact in the area of atomic-structure calculations. The early version of the MCHF program, published in the first volume of Computer Physics Communications received two Citation Classics Awards in 1987. One of her largest efforts in the field is the recent calculation of the complete lower spectra of the beryllium-like to argon-like isoelectronic sequences, amounting to the publication of data covering 400 journal pages and a total of over 150 ions.

She is currently an emerita research professor of computer science at Vanderbilt University and a guest scientist of the Atomic Spectroscopy Laboratory at NIST.

The information is based on a personal file and
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