

Perey C M & Perey F G. Deuteron optical-model analysis in the range of 11 to 27 MeV. *Phys. Rev.* 132:755-73, 1963.
[Neutron Physics Div., Oak Ridge National Lab., Oak Ridge, TN]

A systematic optical-model analysis of deuteron elastic scattering was performed. Very good description of the data was obtained with four distinct families of potentials. The reason for these distinct families was determined and an average set of parameters given. [The SCJ[®] indicates that this paper has been cited in over 450 publications since 1963.]

C.M. Perey
Engineering Physics Division
Oak Ridge National Laboratory
Oak Ridge, TN 37830

June 30, 1983

"The realization of this work was very much a family endeavor since the coauthor is my husband, Francis. When we moved to Oak Ridge in September 1960 because Francis had accepted employment at the Oak Ridge National Laboratory (ORNL), I became a full-time dutiful wife and mother. I had just obtained a master's degree in atomic physics from the Université de Montréal (Canada). Since the hiring policies of the national laboratories were very restrictive concerning noncitizens, I had not applied at ORNL. Nevertheless, 'pour l'amour de l'art,' Francis suggested that I perform an optical model analysis of deuteron elastic scattering data using the computer code he had written and with which he was doing an analysis of proton elastic scattering. Since I was not an employee of ORNL, Francis would submit the 'jobs' for me

to the computer and bring home the outputs for analysis. Fred Maienschein, who was the associate director of the Neutron Physics Division at that time, became aware that I was working under such conditions. His reaction was, in essence, that if I was working I should get paid. It was only after considerable effort on Maienschein's part that in March 1962 I was offered a 40-hour-per-month consultant contract. That contract remained in effect for the next 16 years when new regulations came into being and I could no longer be a consultant. However, I could continue to work as a part-time employee.

"It is very difficult to conjecture why this paper became a *Citation Classic*. However, it is worth noting that the proton analysis that Francis was working on when he suggested I do this deuteron optical-model analysis, published¹ just three months earlier, was selected as a *Citation Classic* in 1980.

"Since what was found in these two analyses was quite different, it seems that one could attribute their popularity to something they have in common. Both are optical-model analyses, and they use the same methodology leading to average sets of parameters. These average sets have been widely used, in particular in the deuteron induced nuclear reactions where the outgoing proton is detected. This nuclear reaction was a very useful tool in the 1960s and 1970s for the study of nuclear structure.

"Our early work on the analysis of deuteron elastic scattering has been carried on in the last 20 years as new data became available. The outstanding work of Daehnick, Childs, and Vrcel² of the University of Pittsburgh shows what can now be accomplished on a much extended data base."

1. Perey F G. Optical-model analysis of proton elastic scattering in the range of 9 to 22 MeV. *Phys. Rev.* 131:745-63, 1963.
[Citation Classic. *Current Contents/Physical, Chemical & Earth Sciences* 20(27):10, 7 July 1980.]
2. Daehnick W W, Childs J D & Vrcel J Z. Global optical model potential for elastic deuteron scattering from 12 to 90 MeV. *Phys. Rev. C—Nucl. Phys.* 21:2253-74, 1980.