

## **George Feher awarded the 1976 Oliver E. Buckley Solid State Physics Prize by the American Physical Society**

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Dr. George Feher, professor of physics at the University of California, San Diego, has been awarded the 1976 Oliver E. Buckley Solid State Physics Prize by the American Physical Society for his development of electron nuclear double resonance (ENDOR) and the application of spin resonance to a wide range of problems in the physics of condensed matter.

The \$5,000 prize, endowed by the Bell Telephone Laboratories, will be awarded at the Society's annual meeting to be held in Atlanta March 29 to April 1. Feher will present a paper based on his research at the meeting.

ENDOR is a combination of two powerful techniques: electron paramagnetic resonance (EPR) discovered by Zavoiski in 1945 and nuclear magnetic resonance (NMR) discovered in 1946 by Felix Bloch and Edward Purcell who later received the Nobel Prize in physics for their work.

"Both techniques are based on the same principle," Feher said. "The nucleus and the electron of an atom have a magnetic moment and they precess in an applied magnetic field.

"When an external electromagnetic (radio) field is applied whose frequency equals the precessional frequency of the nucleus, electromagnetic energy is absorbed. The exact frequency and dynamical behavior of this process is used as a 'fingerprint' of the environment of the nucleus and electron."

"These techniques are now used universally in practically every biochemical, chemical or physical laboratory," Feher said, "and there are dozens of manufactured instruments from which to choose."

ENDOR is the combination of the two techniques. Because of the larger magnetic moment of the electron, EPR is between a thousand and a million times more sensitive than NMR. In ENDOR, one uses the electron (i.e. EPR) to monitor the nuclear transitions. In essence, one uses the highly sensitive EPR techniques to do an NMR experiment. ENDOR, then, applies simultaneously two frequencies corresponding to the precessions of both the electron and the nucleus. (Precession is the gyration of a rotating body about its axis.)

A recent example of the application of ENDOR was in the determination of the electronic structure of the primary donor in bacterial photosynthesis. Recently Feher and collaborators conducted an experiment which demonstrated that the electron donor is a specialized dimer (sandwich) of two bacteriochlorophylls.

Feher, 51, born in Czechoslovakia, received his bachelor's, master's and doctoral degrees from UC Berkeley. He has been a professor of physics at UC San Diego since 1960.

He received the 1960 American Physical Society Prize for origination and development of ENDOR and a National Science Foundation Senior Postdoctoral Fellowship in 1967. He was elected to the National Academy of Sciences in 1975.

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