Ahmed H. Zewail (born February 26, 1946, Damanhur, Egypt--died August 2, 2016, Pasadena, California, U.S.) Egyptian-born chemist who won the Nobel Prize for Chemistry in 1999 for developing a rapid laser technique that enabled scientists to study the action of atoms during chemical reactions."Scientists the world over are studying processes with femtosecond spectroscopy in gases, in fluids and in solids, on surfaces and in polymers. Applications range from how catalysts function and how molecular electronic components must be designed, to the most delicate mechanisms in life processes and how the medicines of the future should be produced."Zewail also used elements of femtochemistry to invent a 4D electron microscope, with which operators were able to investigate the dynamics of atoms one billion times faster than they could with previous microscopes.Zewail was the first Egyptian and the first Arab to win a Nobel Prize in a science category After receiving B.S. (1967) and M.S. (1969) degrees from Alexandria University, Zewail attended the University of Pennsylvania, where he earned a doctorate in 1974.In the late 1980s, however, Zewail was able to view the motion of atoms and molecules by using a method based on new laser technology capable of producing light flashes just tens of femtoseconds in duration.During the process, known as femtosecond spectroscopy, molecules were mixed together in a vacuum tube in which an ultrafast laser beamed two pulses."With femtosecond spectroscopy we can for the first time observe in 'slow motion' what happens as the reaction barrier is crossed," the Nobel Assembly said in its press release announcing Zewail as the winner of the 1999 prize for chemistry.The characteristic spectra, or light patterns, from the molecules were then studied to determine the structural changes of the molecules.Two years later he joined the faculty at the California Institute of Technology, and in 1990 he was selected as the school's first Linus Pauling Professor of Chemical Physics.He founded (2011) Zewail City of Science and Technology, a premier institute of technology in Cairo.Because chemical reactions last only 10 to 100 femtoseconds (fs)--one femtosecond is 0.000000000000001 second, or 10−15--many believed it would be impossible to study the events that constitute a reaction.Zewail's discovery enabled scientists to gain more control over the outcome of the chemical reaction, and it was expected to have many applications.Zewail also served as a visiting professor at a number of institutions, including Texas A&M University, the University of Iowa, and American University at Cairo.The breakthrough created a new field of physical chemistry known as femtochemistry.

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