



## Dudley Herschbach

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Harvard University, Cambridge, Massachusetts, USA

### Taming wild molecules

Chemical reactions ordinarily occur within vast mobs of molecules, obscuring what actually happens. This talk will describe how such molecular wildness has been tamed to reveal the intimate dynamics of single reactive collisions between pairs of molecules. Key tools have been supersonic jets that send beams of molecules traveling into high vacuum; spectroscopic techniques, especially exploiting lasers; and extremely sensitive detection methods. As well as illustrating some prototypical cases, my talk will emphasize beckoning frontiers. Among them is pursuit of ultracold conditions which make the molecules, in accord with quantum mechanics, behave like waves rather than particles. Another exotic emerging area, dealing with "quantum information", seeks to attain greatly enhanced computational power. Landmark episodes include interchanging light and matter waves as well as teleportation, called by Einstein "spooky action at a distance".

#### BIO

Dudley Herschbach was born in San Jose, California (USA). He received his BSc degree in Mathematics (1954) and MSc in Chemistry (1955) at Stanford University, followed by an AM degree in Physics (1956) and PhD in Chemical Physics (1958) at Harvard University. He started lecturing in physics and chemistry at Berkeley University in 1958. In 1963 he returned to Harvard as Professor of Chemistry where he became Baird Professor of Science (1976-2003). He is now a Research Professor Emeritus at Harvard and has also joined the Texas A&M University faculty in 2005 as part-time Professor of Physics. Prof. Herschbach is a member of many academies and institutions and has received numerous international honors and awards. Along with his collaborator Yuan T. Lee and the Canadian chemist John C. Polanyi, he received the Nobel Prize in Chemistry in 1986 for their contributions concerning the dynamics of elementary chemical processes. Herschbach is a passionate advocate of science education and science for the general public. He frequently lectures students of all ages. He serves as Chair of the Board of Trustees of Science Service, which publishes *Science News* and conducts the Intel Science Talent Search and the Intel International Science and Engineering Fair. Herschbach also lent his voice for The Simpsons "Treehouse of Horror XIV" episode, where he presents the Nobel Prize in Physics to Prof. Frink.