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Free Electrons and Molecules – a Lifelong Passion¹

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I shall present a personal retrospective of a few highlights of my nearly life-long fascination with encounters of free electrons with atoms and molecules. With a modest number of graduate students, we built electron spectrometers which permitted us to measure in hitherto inaccessible regions in terms of low energies, higher resolution, higher sensitivity and low background, scattering angles extending to 0° and 180° . The infrastructure was continually improved and was used to look into many aspects of the intricate inner life of resonances and how they make physical and chemical changes happen. Collaborations with a number of theoretical groups were of decisive importance in the entire enterprise. The highlights will include:

- Electronic excitation of atoms and molecules.
- Nonlocal and threshold effects.
- How do two-dimensional electron-energy loss spectra reveal nuclear dynamics of negative ion resonances.

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