EPR – an interesting topic?

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In contrast to NMR, which is in the state of an ongoing development of its technique even when judging from the instrumentation found in "standard" chemistry departments, seen with the eyes of graduate students, EPR spectroscopy instead seems to be a rather static method. This impression unfortunately originates from an outdated infrastructure found in most university institutes, and therefore students do not have a chance to learn about the proliferation of its experimental techniques over the last two decades. Actually, the application of modern EPR in the field of Biology, Chemistry and Physics has let to a surge of high-level research papers, covering the study of charge and spin transport in photosynthetic reaction centers, the exploration of spin-dependent reactions in solution, the study of molecular magnets, and finally the detection of single electronic spins, most of it not being adequately covered in standard curricula.

In this contribution I will present my personal view of the development of EPR in the last decades. I will try to show that even in a "mature" field of science, sudden changes in availability of techniques or in the attitude of the scientific community can lead to a major break through. It is most gratifying that such situations offer a lot of opportunities for young scientists. I was lucky enough to experience the transformation of continuous wave (c. w.) EPR to Fourier-transform EPR (FT-EPR), allowing EPR spectroscopy to be performed with ultimate frequency resolution and opening the way to the study of light-induced reactions in solution. Nearly at the same time, the electronic Larmor frequency was increased substantially, thus enabling a much easier study of electronic "high-spin" systems. Examples showing this development will be presented.

The classification as "interesting" for a research field requires a balanced match between challenging experimental techniques and scientific problems of general interest. The current race towards ever higher resonance frequencies, to faster time resolution and towards the investigation of single paramagnetic centers offers a bit of every thing. Combining this with the need for selective distance determination on the nanometer scale, EPR will have a bright future.