

5th Richard F.W. Bader Memorial Lecture

1st June, 2016, at 17.00, Collin Chapman Room, Woodbury Park, Exeter, UK



"What is Picotechnology? Was R. F. W. Bader the 1st Atomic Engineer?"

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Nanotechnology is the scientific investigation of matter at the nanometer scale – roughly from one to hundreds of nanometers – and engineering systems that take advantage of the properties of matter at that scale. In other words, molecular (or supramolecular) engineering. Similarly, “femtotechnology” corresponds to the scientific investigation of matter at the femtometer scale and engineering systems that take advantage of the properties of matter at that scale. In other words, nuclear engineering. Picotechnology should therefore be defined as the scientific investigation of matter at the picometer scale – from one to hundreds of picometers - and engineering systems that take advantage of the properties of matter at that scale. In other words, atomic engineering? Yes, and this is the answer to the first titular question.

R. F. W. Bader’s Quantum Theory of Atoms In Molecules (QTAIM) allows for the definition of well-defined, measurable, reproducible, and often transferable properties of atoms in molecules. Such data can be classified as quantum atomics, and is analogous to other –omics such as genomics, proteomics, etc... The lecture will recount experiences as a student and collaborator with Bader, and also present some of the speaker's ongoing research on sub-atomic features that are well-defined (by the topological properties of the Laplacian of the electronic charge density), measurable, reproducible, and often transferable. Such data is continuously being generated by multiple experimental and computational research groups worldwide, for atoms from most regions of the periodic table.