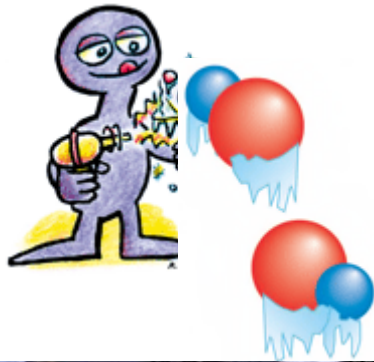


# Cold and ultracold **molecules**: what are they good for?

<http://monash.edu/science/about/schools/physics/research/>  
<http://www.mpg.de/Theorygroup/CIRAC/>



High resolution spectroscopy, test of fundamental theories, quantum simulators of condensed phase Hamiltonians, anisotropy in quantum degenerate gases, quantum information,...

a novel « (ultra-)cold photo-physical chemistry »:

**Understanding elementary reactions at the single quantum state level,**

Role of excited states, quantum resonances,  
Control of energy deposition in a molecular system  
Reactivity at short/large distances...

The hope: to achieve full control of internal and external degrees of freedom of quantum systems

The need: To fully elucidate the details of molecular structure, i.e. to solve a N-body problem, strongly depending on the value of N

**STRONG INTERPLAY BETWEEN THEORY AND EXPERIMENT**

**Théomol**

