MAX-PLANCK-INSTITUT
FÜR QUANTENOPTIK

Master Thesis

Precision Laser Spectroscopy of trapped Lithium Ions to test Quantum Electrodynamics

Quantum Electrodynamics (QED) is seen as the best-tested theory in all of physics and served as the blueprint for any other quantum field theory. Testing QED means to compare its predictions with experimental results. For that purpose, one is seeking systems that can both be calculated and measured with the best accuracy. Unfortunately there are only two systems that allow the comparison of theory and experiment with 12 digits, atomic hydrogen and the gyromagnetic ratio (g-factor) of the electron.

Another route for independent high precision tests has opened in recent years as QED calculations for two- and even three-body systems are getting much more accurate. Several groups are working on precision measurements on helium. We believe that helium-like lithium ions can as well add important data. Unlike neutral helium, it is charged and can be held indefinitely in an ion trap such that almost all important systematic effects, like Doppler shifts and collisions, are absent.

If you are interested and want to learn more please contact:

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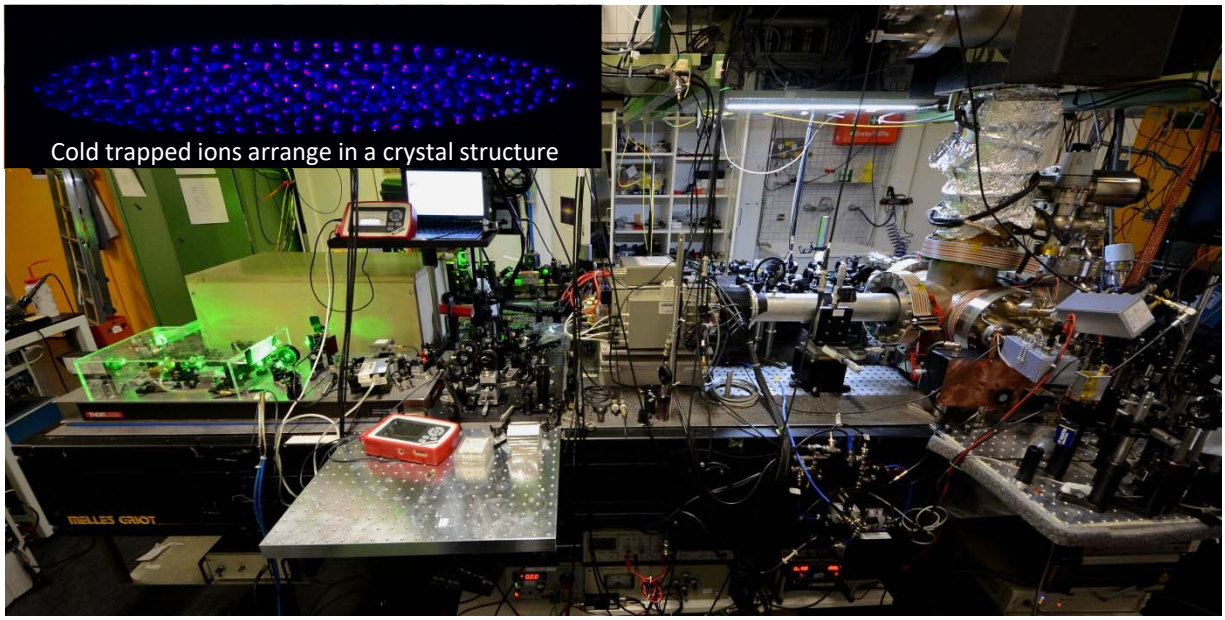

Ion trap set-up with cooling and spectroscopy lasers

For more information please see: www.mpq.mpg.de/4425349/laser