Precision measurements in diatomic molecules: a route to a permanent electric dipole moment

Boeschoten, Alexander

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Propositions accompanying the dissertation

Precision measurements in diatomic molecules: a route to a permanent electric dipole moment

1. Searches for new physics in molecules require a combination of experimental precision, experimental accuracy and theoretical interpretation.

2. In atoms and molecules, the sensitivity to unknown physics can be larger than in smaller systems such as the neutron and electron, yet the understanding of the known physics in these systems requires more work due to the complexity of the systems.

3. Optical Bloch equations are used for many years for the descriptions of the time evolution of coupled multi-level quantum systems. Advances in computing technologies allow us to reduce approximations and simplifications in these calculations and make this approach suitable for precision measurements.

4. A description of the measured signal in terms of experimental parameters such as the external electric field and laser intensity, permits to disentangle the effect of the EDM from the effect of other parameters on the measured signal.

5. The simultaneous measurement of the EDM, the electric field and laser intensity does not only limit possible systematic biases, but also increases the measurement time, since less auxiliary measurements need to be performed.

6. The use of jargon is difficult to avoid and can be useful for quick communication. However, it should be used with care in scientific communication to prevent misinterpretations.