Temperature Measurements in Optical Tweezer Experiments

Mathias Höld, BSc.

2016

1 Introduction

2 Motivation

3 Simulation

The problem at hand can be studied on an atomic level with the use of computer simulation. There is a variety of methods for computer simulations that are widely used, one of which being Molecular Dynamics (MD) simulations. The following section will give a brief overview of the concepts of this method, which is followed by the application to the simulation of the experiment.

3.1 Molecular Dynamics

Molecular Dynamics[1] simulations is a technique for simulating, as the name suggests, the dynamics of a classical many-body system. In this case, classical means, that the trajectories of the individual particles are calculated using classical mechanics rather then quantum mechanics. For relatively big atoms/molecules this is a very good approximation, whereas for systems consisting of hydrogen or helium the effects of quantum mechanics cannot be neglected and other methods (such as ab-initio simulation) has to be used.
The dynamics of the system are obtained by solving the

4 Results

5 Conclusion

References

[1] D. Frenkel and B. Smit. *Understanding Molecular Simulation: From Algorithms to Applications*. Computational science series. Elsevier Science, 2001.