thilo.glatzel@unibas.ch

Scientific Report

Fortgeschrittenen Praktikum I / II

Thilo Glatzel

February 20, 2006

Abstract

The abstract should contain about 50 words briefly describing the main features of the report, such as type of apparatus used, the parameters varied and finally the final value with errors.

Contents

The report should be approximately five MS-Word/LaTeX processed pages long, not including titlepage, contents and appendices. All diagrams and graphs should be included in the body of text, not as separate pages. It should be written in scientific English/German. Scientific reports are written in the 3rd person or the third person plural, for example: 'the temperature was measured' or 'we measured the temperature' NEVER: 'I measured the temperature' (even though this may be true!) Avoid using long sentences, and make every word count. HOWEVER, don't worry, the standard of English/German will not be considered, only the scientific content and layout.

Some words about LaTeX: In near future you will have to write a "Projektarbeit", your master or PhD thesis. Most of the physics students are using LaTeX because its much easier to handle big documents with it. Some of the major advantages are:

- including multiple images without "jumping figures",
- easy writing mathematical equations,
- easy literature referencing with BibTeX and cross, referencing possibilities,
- professional layout and typesetting, which is used for the most scientific publications.

For Windows users you can find the LaTeX program package at http://www.miktex.org/. A graphical user interface for typing is for example WinEdt (http://www.winedt.com/). You can find a lot of additional information about LaTeX in the Internet.

1 Introduction

This should explain the historical background of the experiment and the reason for doing it.

Each section can be divided into sub- or subsubsections.

1.1 subsection

1.1.1 subsubsection

2 Theory

This section explains briefly all the relevant theory. Equations should be numbered and appropriate references should be given. As an example the following equation (1) was taken from [5]:

$$\frac{\partial F}{\partial z} = \frac{k}{\pi A}\sqrt{\frac{2k_B T \Delta\omega}{\pi\omega_0 k Q}} \tag{1}$$

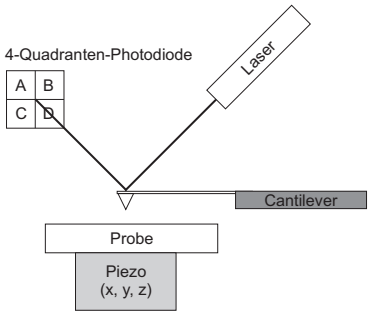

Figure 1: Schematic diagram of the beam-deflection Atomic Force Microscope. A light beam is reflected off the rear side of the cantilever. Angular deflections of the laser beam are measured with a position-sensitive detector (4-quadrant photodiode).

3 Experimental Procedure

Start with a diagram of the experiment (see Fig. 1), correctly annotated. The diagram should be imported as an image file (.eps). Following the diagram should be an explanation of the apparatus and the procedure used. Possible error sources should be addressed and quantified. The recorded measurement data should be written in the lab-journal and not in the report. However, in some cases it is useful to put the data in the appendix (A).

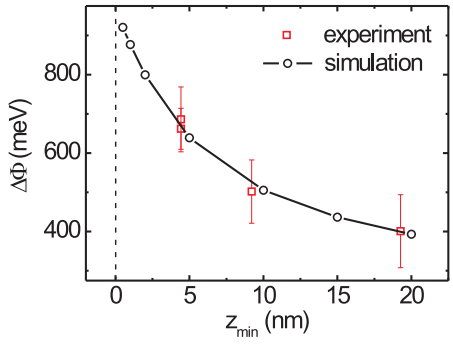

Figure 2: Simulation, according to a simple parallel plate capacitor model, and experimental results of the work function difference $\Delta\Phi$ for a solar cell cross-section, measured by means of Kelvin probe force microscopy in dependence of the minimum tip-sample distance z_{min}.

4 Results

This section should only include the presentation of the results that have been processed, most commonly results in graph form as presented in Fig. 2. Excel/Origin/gnuplot can be used for the graphs and then imported into the document. Do not include tables of raw values. The graphs should be labelled appropriate including units. Also error bars should be included if available.

5 Discussion and Conclusion

This section draws the conclusion of the experiment. It should quote the values found in the experiment, including errors. This value should be compared to the commonly accepted 'literature value'. Any differences between the two values should be explained.

References

[1] Reference all books or other sources of information (eg. Internet pages...) used to write the report. You can also use BibTeX for referencing.

[2] H. Vogel. Gerthsen Physik. 19. Auflage. Springer Verlag

[3] Bergmann, Schäfer. Mechanik, Akkustik, Wärme. Walter de Gruyter, 1990

[4] Handbook of Chemistry and Physics

[5] E. Meyer et al., Scanning Probe Microscopy, Springer Verlag 2002.

A Appendix