

Paper

Use the hand-out “On Preparing A Manuscript for Publication” and the following description of a scientific paper as guideline for the two papers of your main project. The first paper should include the title, the “introduction/background”, the “model/method” and the “references”, which are cited in these parts of the paper. In the second and final paper you will write the complete paper (revisit the sections of the first paper for changes.) Use a more formal writing style than you will use in your oral presentation.

Audience: Your audience will be juniors and seniors who most likely do not have your background. Include therefore all information which is necessary to understand your project. You may assume however that your audience knows the material of PHYS 211, 212, and 221.

Examples:

- D. Chowdhury, L. Santen and A. Schadschneider, “Vehicular Traffic: A System of Interacting particles Driven Far From Equilibrium,” *Curr. Sci. India* **77**, 411 (1999). (We will use this paper near the end of this course.)
- R. G. Della Valle and H.C. Andersen, “Molecular Dynamics Simulation of Silica Liquid and Glass,” *J. Chem. Phys.* **97**, 2682 (1992).

Contents:

- Title
- Author(s), Address
- Abstract: An abstract is a summary of what you did and your results. The abstract is for a reader who might not have time to read the rest of your paper or who decides depending on your abstract if she or he reads the whole paper. The abstract should be understandable without the rest of the paper and should contain: the system you study, the model, the method and the results.
- Text: The following text should be understandable by itself. Reference any information which you used from other sources or which includes details not necessary for the reader’s understanding.
 - Introduction/Background¹:
This section might give some historical background and/or necessary background information. You might talk about other models than the one you use. The Introduction also serves as a motivation for why your project is of specific interest and importance. The main purpose of the introduction is to put your project into context and to give a general description of your project. You might end your introduction with an outline of the rest of the paper.

¹Sometimes this is split into two sections

- Model:
In this section you describe your model exactly. This includes for example the dimension of your system, whether you use a lattice and all applied rules (as e.g. the steps in the Nagel-Schreckenberg traffic flow model). In principle, after reading your description any reader should be able to write the program with exactly the same model as yours.
- Theory:
This is a section one uses if there are analytical calculations possible. For theoreticians this is the main section.²
- Simulation:³
This section includes the method you use. Together with the model section all information should be provided that the reader could reproduce your data, i.e. all used parameter values should be given.
- Results:
This section describes the results of your project. It can include tables, formulae and figures. Tables and figures should have captions and formulae should be numbered.
- Conclusions/Discussion:
In this section you draw conclusions of your results and you might include what one could do in future work.
- References:
This is the bibliography of all references to which you refer in the text.

²Mark, in your case there are some continuous models which have been approximately solved. Rob you may give here further information for the background and you should explain the cases which are analytically solvable. Buck, you will need to provide scattering theory.

³This section is often combined with the section “Model.”