An Introduction to LaTeX

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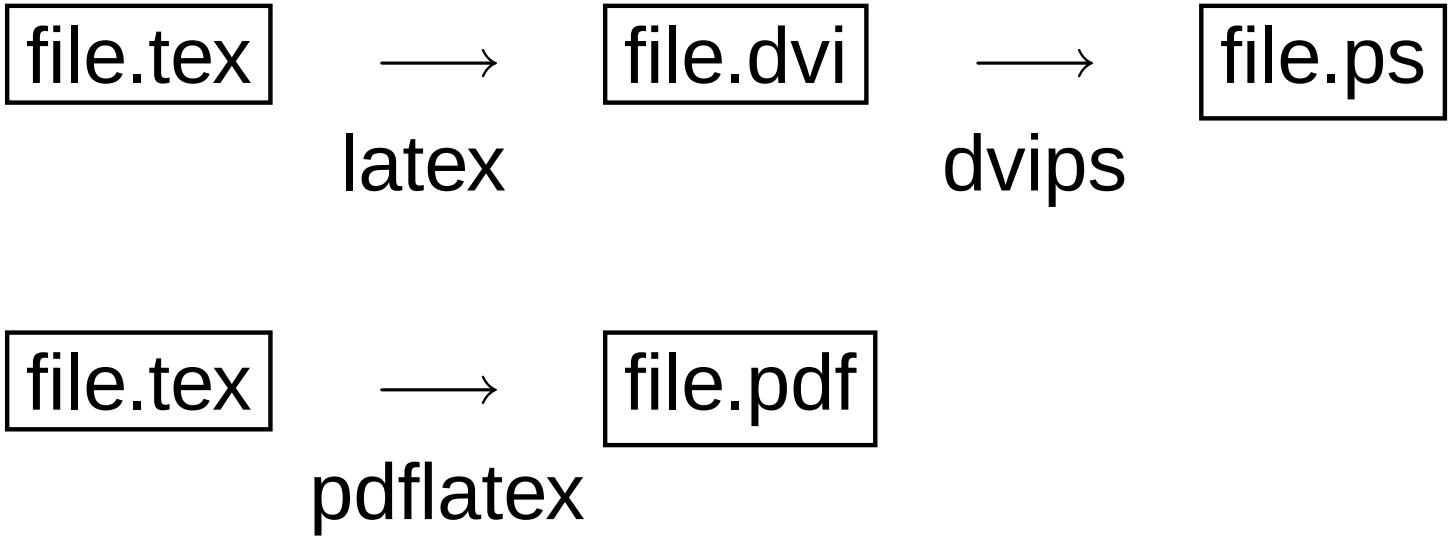
- Overview
- APS class (Revtex 4)
- Posters (ugaposter)
- *PowerPoint* presentations (prosper)

What is LaTeX?

- Powerful text processing language.
- Required format for some periodicals now.

Compilation process:



Features

- Free and available for many OS.
  - (E.g.: Miktex for Windows)
- Files are ASCII and are portable.
- You can use the editor of your choice.
  - Notepad, Wordpad, WinEdit for Windows
  - Emacs, vi, vim, xedit for Unix
- Automatic cross-referencing of chapters, sections, tables, figures, bibliography.
- Produces “good-looking” equations.
- Many periodicals provide class files.
- Can include .ps, .eps, .pdf figures.

Disadvantages

- Unflexible formatting (difficult to change position of figures).
- Font selection more difficult than with Word.
- Requires compilation.
- Cannot include many file extensions (.tiff,.jpg)

Basic structure

```
\documentclass[12pt]{article}
\begin{document}
Text goes here.
\end{document}
```

Class files in LaTeX2e: article.cls, book.cls, letter.cls, report.cls, slides.cls, prosper.cls, a0poster.cls

Class files from Periodicals: revtex4.cls (APS), iopart.cls (IoP), elsart.cls (Elsevier).

(LaTeX 2.09 used style files: article.sty, revtex.sty)

Revtex4

```
\documentclass[10pt,prb]{revtex4}
\usepackage{graphicx}
\begin{document}
\title{Phase transitions in ice-cream}
\author{G. Garfield}
\author{S.-H. Tsai}
\affiliation{Dept. of Low Temperature Physics}
\begin{abstract}
...
\end{abstract}
\maketitle
\section{Introduction}
...
\end{document}
```

Revtex3

```
\documentstyle[10pt,prb]{revtex}
\input epsf
\begin{document}
\title{Phase transitions in ice-cream}
\author{G. Garfield and S.-H. Tsai}
\address{Dept. of Low Temperature Physics}
\maketitle
\begin{abstract}
...
\end{abstract}
\section{Introduction}
...
\end{document}
```

\documentclass[twocolumn]{revtex4}

Effect of chocolate on ice-cream melting temperature

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[b] *Enterprise IT Services, University of Georgia, Athens, GA 30602*

Monte Carlo simulations have been used to study magnetic ordering in coupled anisotropic ferro/antiferromagnetic (FM/AFM) films of classical Heisenberg spins. We consider films with flat interfaces that are fully uncompensated as well as rough interfaces that are compensated on average.

Ferromagnetic/antiferromagnetic (FM/AFM) bilayers have been shown to exhibit a unidirectional shift in the hysteresis loop (exchange bias) and a significant increase of the coercivity. Magnetic properties of FM/AFM bilayers can also be drastically different from those of free FM and AFM films. For example, even though in most exchange bias systems the blocking temperature is lower than the Néel temperature of the antiferromagnet, order in the AFM has been observed above the Néel temperature due to the coupling to the ferromagnet.

Earlier theoretical work has shown that for compensated interfacial exchange (*i.e.* zero net exchange interaction across the FM/AFM interface) the FM aligns perpendicular to the AFM easy axis. Although similar perpendicular orientation has been observed in numerous FM/AFM systems, understanding the nature of the interfacial coupling and roughness in FM/AFM bilayers remains a challenge.

Writing equations

```
\begin{equation}
\vec{F} = \frac{q_1 q_2}{r^2}
\label{eq:cforce}
\end{equation}
See Eq.(\ref{eq:cforce}) above.
```

$$\vec{F} = \frac{q_1 q_2}{r^2} \tag{1}$$

See Eq.(1) above.

Inserting figures

```
\begin{figure}
\includegraphics[clip,angle=0,width=12cm]{sample.eps}
\caption{Consumption rate}
\label{fig:sample}
\end{figure}
```

Inserting figures

```
\begin{figure}
\includegraphics[clip,angle=0,width=12cm]{sample.eps}
\caption{Consumption rate}
\label{fig:sample}
\end{figure}
```

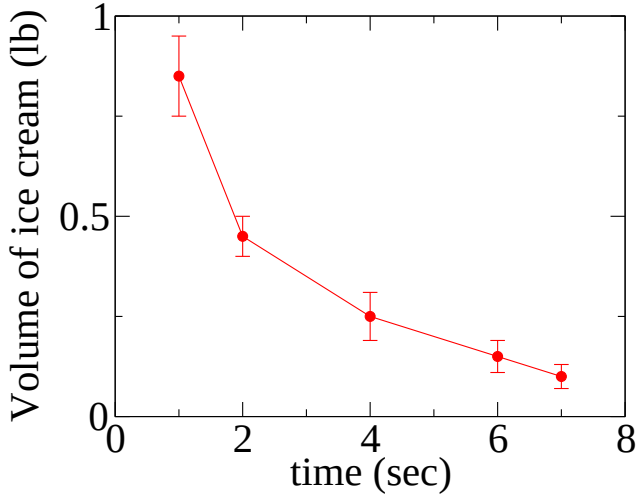

Figure 1: Consumption rate

Inserting figures

```
\begin{figure}
\includegraphics[clip,angle=0,width=12cm]{sample.eps}
\caption{Consumption rate}
\label{fig:sample}
\end{figure}
```

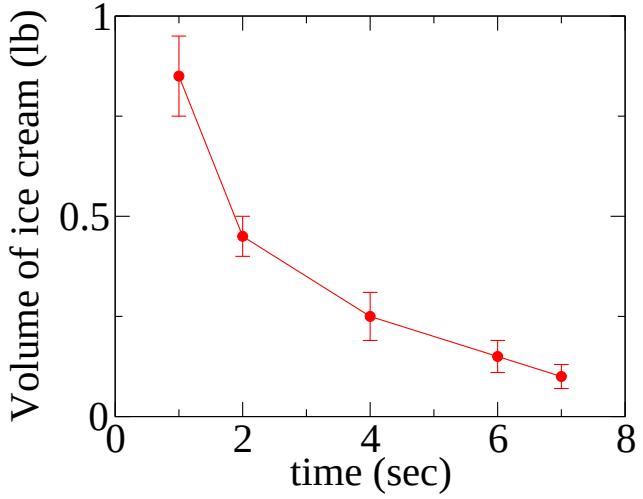

Figure 1: Consumption rate

(Revtex3 used \epsfig)

References

We perform Monte Carlo simulations with Metropolis algorithm\cite{metrop53}.

\begin{thebibliography}{00}
\bibitem{metrop53} N. Metropolis et al, J. Chem. Phys. {\bf 21}, 1087 (1953).
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(Revtex3 used \begin{references})

Ugaposter

- LaTeX class created by Andy Schweitzer.
- For producing large posters (.ps files)
- Some pre-defined sizes:
  - UGASMALL: 24” x 31”
  - UGAMEDIUM: 36” x 46”
  - UGALARGE: 42” x 54”

http://dilbert.physast.uga.edu/∼andy/ugaposter.tgz

```
\documentclass[portrait,ugamedium]{ugaposter}
\usepackage{multicol}
\usepackage{graphicx}
\begin{document}
\title{\VERYHuge Monte Carlo Simulations}
\author{A. Einstein}
\large{Center for Simulational Physics}
\maketitle
\begin{multicols}{3}
\thispagestyle{empty}
    Body of poster goes here.
\end{multicols}
\end{document}
```

(see sample)

Prosper

- LaTeX class for making *PowerPoint* (PPT) presentations.
- Has some PPT features (custom animation, color background, large font sizes, colored text).
- Creates a pdf file (smaller than PPT files).
- Use Adobe Reader for presentation.
- Structure and font selection not as easy.
- Advantageous if using many equations.
- Can add color to equations.

```
\documentclass[pdf,slideColor,Azure]{prosper}

(custom definitions, e.g.:)
\newrgbcolor{mypink}{1.0 0.4 0.8}

\begin{document}

\begin{slide}{Title of slide 1}
    Contents of slide 1 go here
\end{slide}

\begin{slide}{Title of slide 2}
    Contents of slide 2 go here
\end{slide}

\end{document}
```

(see sample)

Summary

LaTeX is a very powerful text processing language, especially useful for Physics/Math publications.

Some references:

- *A Guide to LATEX: Document Preparation for Beginners and Advanced Users*, H. Kopka and P.W. Daly, 1999.
- *LaTeX: A Document Preparation System*,L. Lamport, 1994.
- Lots of free stuff on the web.