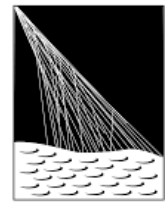# PhD draft test title

To obtain the academic degree of

Doctor of Science

from the Faculty of Physics of the
Karlsruhe Institute for Technology (KIT)

and

from the Institute of Technology "Prof. Jorge A. Sábato" of the
Universidad Nacional de General San Martín (UNSAM)

submitted

Dissertation

of

Paul Filip

born in Breisach am Rhein

Day of the oral exam: 01.01.1970

Referent: Prof. Dr. Ralph Engel

Co-referent: Prof. Dr. Missi Ngno

Supervisor(s): Dr. David Schmidt

use 'submitted' for hand in, use 'accepted' for final version.

fix page vspace formatting once you have the final title

Abstract awpokrdpoghk very long title asd asd sdlfkgjS:LDKJgl;kSJ

Abstract

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Resumen

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Zusammenfassung

Dies hier ist ein Blindtext zum Testen von Textausgaben. Wer diesen Text liest, ist selbst schuld. Der Text gibt lediglich den Grauwert der Schrift an. Ist das wirklich so? Ist es gleichgültig, ob ich schreibe: „Dies ist ein Blindtext" oder „Huardest gefburn"? Kjift – mitnichten! Ein Blindtext bietet mir wichtige Informationen. An ihm messe ich die Lesbarkeit einer Schrift, ihre Anmutung, wie harmonisch die Figuren zueinander stehen und prüfe, wie breit oder schmal sie läuft. Ein Blindtext sollte möglichst viele verschiedene Buchstaben enthalten und in der Originalsprache gesetzt sein. Er muß keinen Sinn ergeben, sollte aber lesbar sein. Fremdsprachige Texte wie „Lorem ipsum" dienen nicht dem eigentlichen Zweck, da sie eine falsche Anmutung vermitteln.

Chapter1

Contents

Supplementary Information

Todo list

remove todos

add pdf hyperref keywords

1 | Introduction

2 | test shit

2.1   One

2.1.1   One One

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

One One One

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all

letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

One One Two

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

2.1.2   One Two

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

2.2   Two

2.2.1   Two One

2.2.2   Two Two

2.3   Three

2.3.1   Three One

2.3.2   Three Two

2.3.3   Three Three

3 | Example shit

```
\chapter{Chapter: Types of section distinctions}
\blindtext
\section{Section}
\blindtext
\subsection{Subsection}
\blindtext
\subsubsection{Subsubsection}
\blindtext
```

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all

letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.1 Section

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.1.1 Subsection

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Subsubsection

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

3.2 References and labels

3.2.1 Labels

Make sure to label sections to refer back to throughout your work. Make it an intuitive name.

```
\label{sec:cosmicrays}
\label{subsec:crs_eas}
```

3.2.2 Referencing labels

Use cref instead of ref; it smartly labels if it's a section, chapter, figure, table, etc. Fig. 3.1.

```
\cref{fig:crs_eas_heitler1}
\cref{subsec:fd}
```

3.2.3 Citations

If you have a ton of reference, just list them with commas. Latex will properly format [**? ?**]:

```
\cite{Abraham2009b,Abraham2009,Abraham2010a,Abraham2010,Abreu:2011zze,Abreu
    ↪ :2011zzd,Abreu:2011vm,Abreu:2011ki,Abreu:2011fb,Settimo:2012zz,Auger
    ↪ :2012yc,Auger:2012an,Acounis:2012dg,Abreu:2012zz,Abreu:2012zg,Abreu
    ↪ :2012ybu,Abreu:2012pi,Abreu:2012oza,Abreu:2012aniso,Abreu:2011md,
    ↪ Abreu:2013zbq,Abreu:2013qtw,Abreu:2013qfa,Abreu:2013kif,Abreu:2013env,
    ↪ Aab:2014qva,Aab:2014pza,Aab:2014kda,Aab:2014ila,Aab:2014gua,Aab:2014
    ↪ esa,Aab:2014dua,Aab:2014dha,Aab:2014caa,Aab:2014bha,Aab:2014aea,
    ↪ ThePierreAuger:2014nja,PierreAuger:2014yba,Aab2015a,Aab2015,Aab:2015
    ↪ kma}
```

3.3 Acronoyms

There's a neat package called acronyms that will handle them for you. Alex had already set this in the acronym.tex. Just define your acronyms here as he did.

- To use the acronym like **CR!**[1], use:

```
\ac{CR}
```

- To define the acronym in the text—*CMB!* (**CMB!**), use:

```
\acfi{CMB}
```

  If you want this to be the only place in your chapter where the acronym is defined, you need to write:

```
\acfi{CMB}\acused{CMB}
```

  as the acronym package does not automatically count this as a definition.

- To makes the acronym plural. CAVEAT is that acronyms ending in an S will add an extra S which is not typically used in English.

```
\acp{CR}
```

---

[1]**CR!**

- Sometimes acronyms require more complicated definitions, you can define them in the main document and call them throughout. Alex has already defined QGSJET-II.03 and $\overline{\text{Off}}\underline{\text{line}}$:

```
\qgsjet
\Offline
```

3.4   Units

For defining units, use the SI package, as it will consistently format for you. It sometimes may not recognize something like Mpc.
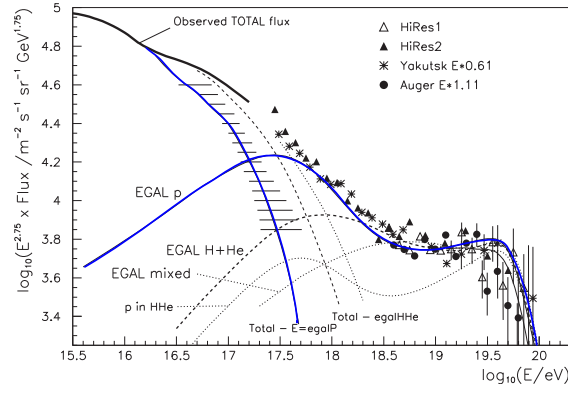
Examples:

- 10^{20} eV

- $12\,\text{km}^2$ for multiple units

- $90\,\%$ for precentages

- $\approx 5{\times}10^{19}$ eV

- $37\,\text{g}\,\text{cm}^{-2}$ for grammage

- $30\,\text{GeV}$ if GeV is not recognized, specify by metric prefix

- $3{\times}10^{15}$ eV

- $30\,\%$ to $60\,\%$ a way to consistently format ranges

- $\text{km}^2\,\text{sr}\,\text{yr}$

```
\SI{e20}{\eV}
\SI{12}{\square\km}
\SI{90}{\percent}
$\approx \SI{5e19}{\eV}$
\SI{37}{\grammage}
\SI{30}{\giga\eV}
\SI{3e15}{\eV} 3{\times}10^{19}
\SIrange{30}{60}{\percent}
$\si{\square\km \steradian \year}$
```

3.5   Figures

In a PhD thesis you should always use only `[t]` (top) figure placement. Also note that due to the `\graphicspath{{figures/}}` command in the preamble, the file paths are relative to the `./figures` directory which can thus be dropped from the line. If you also ommit the filename extension (e.g. `.pdf` or `.jpg`) your source file will be compilable with both, `latex` and `pdflatex`.

Figure 3.1: Illustration of an **EAS!**[2]' particle components.

```
\begin{figure}[h]
  \centering
  \includegraphics[width=0.8\textwidth]{intro/heitler}
  \caption{Illustration of an \ac{EAS}' particle components.}
  \label{fig:crs_eas_heitler1}
\end{figure}
```

(a)
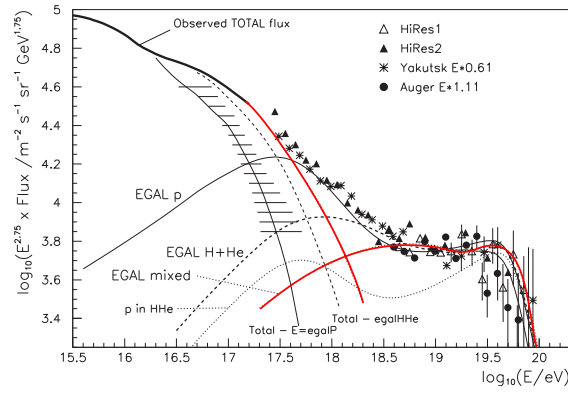
(b)

Figure 3.2: Visualization of the (a) pair production dip [**?**] and (b) mixed composition [**?**] scenarios that describe the ankle feature.

Use `subref` to reference elements within a figure for your text or captions.

```
\begin{figure}[t]
  \centering
  \subfloat[]{\includegraphics[width=0.48\textwidth]{intro/Berezinsky2}
  \label{plot:crs_ankle_berezinsky}
  }\hspace{0.2cm}
  \subfloat[]{\includegraphics[width=0.48\textwidth]{intro/Hillas2}
  \label{plot:crs_ankle_hillas}
  }
  \caption[]{Visualization of the \subref{plot:crs_ankle_berezinsky} pair
    ↪ production dip \cite{berezinskycr} and \subref{plot:
    ↪ crs_ankle_hillas} mixed composition \cite{hillascr} scenarios that
    ↪ describe the ankle feature.}
  \label{fig:crs_ankle}
\end{figure}
```

If you need a footnote in a figure, you have to use `footnotemark`

---

[3]As discussed further in the reconstruction Chapter, quality cuts are performed on reconstructed data from the **SD!**[4]. One of these cuts is known as the 6T5-trigger; it requires that the detector with the highest signal
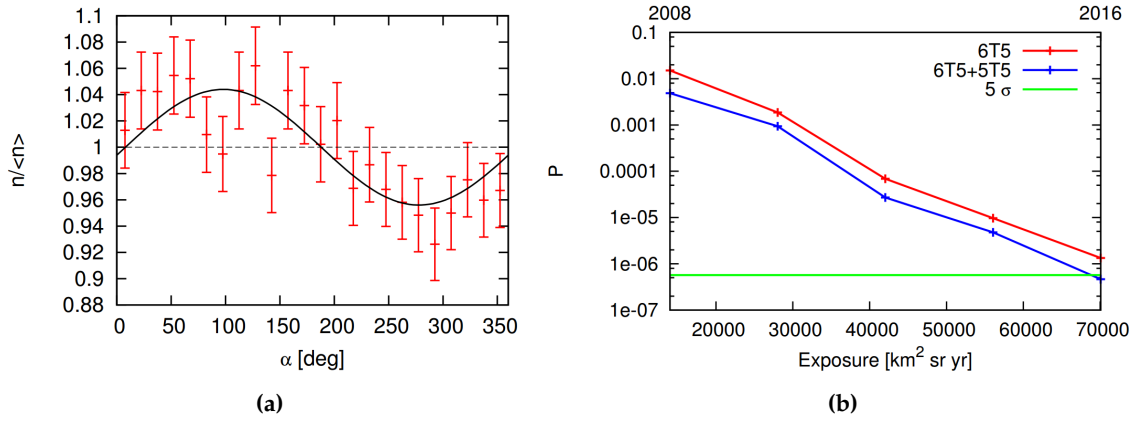
(a) **(b)**

Figure 3.3: (a) (b) Probability for the amplitude of the dipole to arise from an isotropic distribution as a function of the integrated exposure of the Pierre Auger Observatory. Various data sets with different tank triggers are shown [3][**?**].

```
\begin{figure}[t]
  \centering
  \subfloat[]{\includegraphics[height=5cm]{intro/auger_dipole}
  \label{plot:pao_dipole}}
  \subfloat[]{\includegraphics[height=5cm]{intro/auger_dipole_sig}
  \label{plot:pao_dipole_sig}}
  \caption[]{\subref{plot:pao_dipole} \subref{plot:pao_dipole_sig}
      ↪ Probability for the amplitude of the dipole to arise from an
      ↪ isotropic distribution as a function of the integrated exposure of
      ↪ the Pierre Auger Observatory. Various data sets with different tank
      ↪  triggers are shown \footnotemark \cite{Mollerach2016_1}.
  }
\label{fig:pao_dipole}
\end{figure}
\footnotetext{As discussed further in the reconstruction Chapter, quality
    ↪ cuts are performed on reconstructed data from the \ac{SD}. One of
    ↪ these cuts is known as the 6T5-trigger; it requires that the detector
    ↪  with the highest signal has all of its 6 closest neighbors working
    ↪ at the time of the event. Similarly, a 5T5 only requires 5 of the
    ↪ closest neighbors to be working.}
```

Table 3.1: Dipole components and direction in equatorial components [**?**].

E/EeV	$d_\perp$	d_z	d	α	δ
4-8	-0.024 ± 0.010	0.006 ± 0.006	0.025 ± 0.009	$-75° \pm 15°$	$82° \pm 57°$
> 8	-0.026 ± 0.015	0.060 ± 0.010	0.065 ± 0.011	$-24° \pm 12°$	$100° \pm 10°$

3.6　Tables

3.7　Mathematical and decay equations

For decay equations, use align

$$\gamma_{\mathrm{CMB}} + p \rightarrow \Delta^+ \rightarrow p + \pi^0 \,,$$
$$\gamma_{\mathrm{CMB}} + p \rightarrow \Delta^+ \rightarrow n + \pi^+ \,.$$

```
\begin{align*}
  \gamma_\mathrm{CMB} + p \rightarrow & \Delta^+ \rightarrow p + \pi^0 \,
    ↪ ,\\
  \gamma_\mathrm{CMB} + p \rightarrow & \Delta^+ \rightarrow n + \pi^+ \, .
\end{align*}
```

For writing $5.5\,\sigma$, use

```
\sig{5.5}
```

3.8　Reminders

Use to dos so that you don't have to dig through latex code. [inline] makes it so it takes up the line and isn't hanging off the page

- To add a todo inline like this

  more recent spectrum? proper citation to whom?

  ```
  \todo[inline]{more recent spectrum? proper citation to whom?}
  ```

- To generate this for missing figures:

has all of its 6 closest neighbors working at the time of the event. Similarly, a 5T5 only requires 5 of the closest neighbors to be working.

```
\missingfigure{}
```

- To generate a list of all your todos and their page numbers, use

```
\listoftodos
```

3.9 Miscellaneous

- $4.6{\times}10^{-7}$

```
$4.6{\times}10^{-7}$
```

- For degrees 148.4°

```
\ang{148.4} or 148.4^\circ
```

- For formatting numbers otherwise in text, −2.0

```
\num{-2.0} or $-2.0$
```

- Superscripts for text like 20th

```
20\textsuperscript{th}
```

- For marking out text — ~~Due to the clean room environment~~, use:

```
\deleted{Due to the clean room environment}
```

This may be useful for editing your thesis later.

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URL `http://www.sciencedirect.com/science/article/B6TVN-4YC2XC7-3/2/69021ee5b6b08f24e4343776c82fb3ed`

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