

# pdfT<sub>E</sub>X and XML in the Workflow for Conference Proceedings

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Darmstadt, Germany

Practical T<sub>E</sub>X 2004  
Holiday Inn Fisherman's Wharf  
San Francisco, California  
July 20, 2004



## Motivation

- Two years ago appointment as Proceedings Editor for two conferences,
- Responsibility for preparation of *Abstracts*- and *Paper-Submissions*, and participant data (so-called *Affiliations*),
- web presentation and conference volume (*Proceedings*)
- size of conferences small, but too large for manual production
  - **DIPAC2003** 85 papers, 300 pages, 290 authors
  - **LINAC2004** 450 papers, 1400 pages, ~1200 authors
- existing conference systems in particle physics were examined (DESY/CERN)
  - **SRF2003** 185 papers, 620 pages, 520 authors
  - **EPAC/PAC** 1200 papers, 4000 pages, 7500 authors
- Findings:

## Findings

- just the Web presentation is solved in a satisfactory way,
- no platform independent solutions (»Windows only«),
- use of VB scripts in *Paper Submissions* for
  - »Hidden Field« entries,
  - page numbering, and
  - header/footer information.
- adaption to speed of used equipment (»wait xxx«)
- creation of Proceedings only manually with word processors (Word, Quark, etc.)
- latest decision: no proceedings as printed copies anymore
- no batch oriented processing,
- sole Open Source component is PERL
- but. . .

## Shocking

- leveling out to 7-Bit ASCII
- no »special characters« from particle physics
  - $e^+/e^-$
  - $\alpha, \beta, \lambda, \dots$
  - big trouble with names like »DAΦNE«
- name handles are non honored (*van, von, D'*, etc.)
- sorting of names based by ASCII rules
- where to look for your name?
  - Bär, before or after Brønsted, and Budyšin?
  - Sørby after Szyborska!
  - and Čemešič?
- mediocre Proceedings (print and structure)
- no navigation in Web Proceedings

## starting point

## 1 the idea

- typesetting: pdfT<sub>E</sub>X
- scripting: PERL
- data: XML

## 2 the method

- database export in XML
- interpretation of XML by PERL scripts
- transformation to <html> and \pdfT<sub>E</sub>X

## 3 the prerequisites

- XML structure definitions (as DTD, Schema, RelaxNG, ?)
- xml database export (native Oracle 9<sub>i</sub>, 10<sub>g</sub>)
- Unicode (input problem)

Now a short excursion to XML and STRUCTURE. . .

## XML Definition Overview

What kind of structure(s) do we need for a conference?

```

<conference name="...">
  <session name="...">
    <paper code="...">
      <institute ...>
        <author><name>...</><email>...</></author>
        (more »authors«)
      </institute>
      (more »institutes«)
    </paper>
    <paper>...</paper>
    (more »papers«)
  </session>
  (more »sessions«)
</conference>
(more conferences??)

```

## XML Definitions for &lt;conference&gt; and &lt;session&gt;

A *conference* consists of several *sessions*. And for a session you need talks (↦ *paper*) or posters (↦ *paper*).

```

<conference name="conference name">
  <session name="session name" abbr="abbreviation of session">
    <paper code="paper code id" abstract="yes/no">
      (xml »paper« sub-structure)
    </paper>
  </session>
  <session name="..." abbr="...">
    (xml »session« sub-structure)
  </session>
  (more »session« structures)
</conference>

```

## XML Definitions for &lt;paper&gt; and &lt;keywords&gt;

A *paper* consists of several sub-structures: You need a *title* for your paper, and some *keywords*.

```

<paper code="paper id" abstract="yes/no">
  <title[ note="optional title note" ]>
    paper title
  </title>
  <keywords>
    (xml »keyword« structure)
  </keywords>
  <institute>
    (xml »institute« structure)
  </institute>
</paper>

```

And there is always an *institute* you are working for, so you have to be defined as a part of it.



## XML Definition for &lt;institute&gt;

Now you have to define the *institute*, you are part of.  
Finally your name appears in an *author* structure.

```
<institute name="name of institute"
           abbr="institute (abbreviation)">
  <author[ main="optional: "yes" for main author"
          [ note="optional author note"]>
    <name>(xml »name« structure)</name>
    <email>email address</email>
  </author>
  (more »author« structures)
</institute>
```

Even your *name* has some structure, and that comes now. . .

## XML Definitions for &lt;author&gt; and &lt;name&gt;

As the *author* preparing the paper, you set the key *main* to "yes".

```
<author main="yes"[ note="work funded by ..."]>
  <name>
    <initials>author's initials</initials>
    <lastname>author's lastname</lastname>
  </name>
  <email>author's email address</email>
</author>
```

And your *name* consists of *lastname* and *initials* (and maybe an *email address*).

## XML Definition for &lt;keywords&gt;

Finally you have to define the *keywords*. Each entry consists of a single line with a given *keyword*.

```
<keywords>
  <keyword>keyword</keyword>
  <keyword>another keyword</keyword>
  (more xml »keyword« structures)
  ...
  (a maximum of »5« keyword structures)
</keywords>
```

Now you are done for Proceedings volume and web presentation. . .

or even better, everything is done for you by a script from database entries!

## What is the script doing?

- 1 It reads pdf-files and counts pages in each file,
- 2 reads XML, and generates <html> for
  - Session List,
  - Authors' List,
  - Keyword List,
  - Institute List
- 3 generates \pdfT<sub>E</sub>X wrappers
  - for each single (raw) pdf-file,
  - for proceedings file,
- 4 writes command files for
  - generating pdf-files with Authors and Keyword information,
  - building of proceedings file(s).

# <html>features</html>

## Actually built-in features:

- 1 Web pages and proceedings honor special characters,
- 2 Web pages are in Unicode (UTF8),
- 3 All names with accented characters and umlauts,
- 4 Math formulas (in abstracts) on web pages,
- 5 Sorting author names is rule based (accented letters, umlauts, etc. . . .)

Ursid, R.

**Paper Title** Page  
[Response With Sampling Of 500 MHz RF Signal For Digital Receiver Architectures](#) 276

• U. Ursid, S. Rovenc, R. Ursid  
 I-Tech, Instrumentation Technologies, Solon, Slovenia

This article will present test results of a prototype system that was built to evaluate feasibility of a direct sampling of a 500 MHz RF signal for use in digital receiver applications. The system consists of a variable gain RF front end, a fast analog to digital converter (ADC) and a field programmable gate array (FPGA) providing glue-logic between the ADC and a PC computer.

**Paper Title** Page  
[Use of Optical Transducer Resonance Interferometry for Energy Spread and Dispersion Measurements](#) 89

• S. S. Fathi, A. G. Demeroutis  
 Institute for Research in Electronics and Applied Physics, University of Maryland, College Park, MD, USA

OTR interferometry (OTR) has been shown to be an excellent diagnostic for measuring the rms divergence and width of relativistic electron beams when the energy spread  $\Delta\gamma/V$  is less than the normalized rms divergence  $\sigma = \sigma_{\theta}$ . This is the case for most beams previously diagnosed with OTR. To extend this diagnostic capability to beams with larger energy spreads, we have calculated the effects of all the parameters affecting the visibility of OTR interference,  $V$ , i.e. energy spread, angular divergence, the ratio of slit separation to wavelength ratio,  $d/\lambda$  and filter bandwidth. We have shown that:

1. for a given  $\Delta\gamma/V$ , the sensitivity of  $V$  to  $\sigma$  is proportional to the observation angle  $\theta_0$ , the fringe order  $n$  and the ratio  $d/\lambda$ .
2. the sensitivity of  $V$  to  $\Delta\gamma/V$  is independent of  $\theta_0$  and  $n$  but is proportional to  $d/\lambda$ .

DIPAC 2003 – GSI Mainz, Germany -  
 Proceedings  
 GSI Mainz, Germany

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 Keyword Index | Index I

G

A B C D E F G H I J K L M N O P R S T U

Click on an author to display a list of papers.

- Gel, A.
- Genser, H.
- Giacomelli, F.
- Giloi, B. S.
- Gilgus, W. A.
- Gilman, J. W.
- Gitter, A.
- Gooding, J. W. J.
- Gottlicher, P.
- Greening, S.
- Großschäfer, B.
- Grossmann, O.
- Gubelkin, S. G.

&lt;html&gt;feature="Accented Characters"&lt;/html&gt;

**Uršič, R.**

Paper Title

Page

[PT05](#)**Experience With Sampling Of 500 MHz Rf Signal For Digital Receiver Applications**[178](#)

- **U. Mavrič, S. Brevec, R. Uršič**  
I-Tech, Instrumentation Technologies, Solkan, Slovenia

This article will present test results of a prototype system that was built to evaluate feasibility of a direct sampling of a 500 MHz RF signal for use in digital receiver applications. The system consists of a variable gain RF front end, a fast analog to digital converter (ADC) and a field programmable gate array (FPGA) providing glue-logic between the ADC and a PC computer.

Paper Title	Page
<a href="#">PM01</a> <b>Use of Optical Transition Radiation Interferometry for Energy Spread And Divergence Measurements</b>	<a href="#">89</a>

- **R.B. Fiorito, A.G. Shkvarunets**

IREAP, Institute for Research in Electronics and Applied Physics, University of Maryland, College Park, MD, USA

OTR interferometry (OTRI) has been shown to be an excellent diagnostic for measuring the rms divergence and emittance of relativistic electron beams when the energy spread  $\Delta\gamma/\gamma$  is less than the normalized rms divergence  $\sigma = \gamma\Theta_{\text{rms}}$ . This is the case for most beams previously diagnosed with OTRI. To extend this diagnostic capability to beams with larger energy spreads, we have calculated the effects of all the parameters effecting the visibility of OTR interferences,  $V$ ; i.e. energy spread, angular divergence, the ratio of foil separation to wavelength ratio,  $d/\lambda$  and filter bandpass. We have shown that:

1. for a given  $\Delta\gamma/\gamma$ , the sensitivity of  $V$  to  $\sigma$  is proportional to the observation angle  $\Theta_0$ , the fringe order  $\mathbf{n}$  and the ratio  $d/\lambda$ ;
2. the sensitivity of  $V$  to  $\Delta\gamma/\gamma$  is independent of  $\Theta_0$  and  $\mathbf{n}$  but is proportional to  $d/\lambda$ .

Thus, by adjusting  $d/\lambda$ , and choosing the appropriate fringe order, one can separate out and measure both the energy spread and divergence. However, the filter bandpass must decrease with  $\Theta_0$  and  $\mathbf{n}$ . Results of our calculations will be given for various beams of interest.

<html>feature="Sorting Order" (i.e. ö  $\iff$  oe)</html>



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Proceedings  
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[Keyword Index](#) | [Institute In](#)

## G

[Gall, A.](#)  
[Gasior, M.](#)  
[Giacomini, T.](#)  
[Gikal, B.N.](#)  
[Gillespie, W.A.](#)  
[Glatz, J.](#)  
[Gobulev, A.](#)  
[Gössel, A.](#)  
[Goethe, J.W.v.](#)  
[Göttlicher, P.](#)  
[Groening, L.](#)  
[Gschwendtner, E.](#)  
[Guimbal, Ph.](#)  
[Gulbekian, G.G.](#)

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [R](#) [S](#) [T](#) [U](#)

**Click on an author to display a list of papers.**



Actually built-in features:

- 1 printing of header and footer information,
- 2 transfer of all meta-information into pdf-file,
- 3 (down)scale depending on size of crop/media/object-box,
- 4 setting of page numbers after count of all pages,
- 5 author and institute's index with links to articles,
- 6 inclusion of paper or "missing" note,
- 7 config file with settings for directories, sort-rules, and any dependencies etc.

pdfT<sub>E</sub>X: complete code for one paper

```

\documentclass[twoside]{book}
\usepackage[papersize={595pt,792pt}, body={ 483pt, 680pt},
            top=54pt, left=56pt, head=18pt, headsep=15pt, footskip=32pt]{geometry}
\usepackage{fancyhdr}\pagestyle{fancy}

\begin{document}
\pdfinfo{%
  /Title   (Characterisation of Fast Faraday Cups at the ELETTRA Linac)
  /Author  (M. Ferianis, S. Bassanese, G. D'Auria ELETTRA, Sincrotrone Trieste, Trieste, Italy;
           C. Deibele SNS, Spallation Neutron Source, Oak Ridge, TN, USA;
           M. Poggi INFN-LNL, Legnaro, Italy)
  /Subject (Proceedings DIPAC 2003 -- Mainz, Germany)
  /Keywords (diagnostics, electron, ELETTRA, instrumentation, linac)
}
\setcounter{page}{113}
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\fancyfoot[RE,LO]{\large\sffamily Posters Monday}%
\fancyfoot[RO,LE]{\large\sffamily\thepage}%
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   \centering\textsf{\textbf{PAPER NOT YET RECEIVED}}
   \vfill}
}
\end{document}

```

## »geometry« helps to keep the tight frame

```

\documentclass[twoside]{book}
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}
\end{document}

```

## » fancyhdr« prints header and footer information

```

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\IfFileExists{../papers-final/PM10.pdf}{%
  \includepdf[pages=-, scale=1.0,
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  {\Huge\mbox{} \vfill
   \centering\textsf{\textbf{PAPER NOT YET RECEIVED}}
   \vfill}
}
\end{document}

```

## »pdfinfo« transfers all meta info into the pdf file

```

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   \vfill}}
\end{document}

```

## »pdfpages« imbeds the (raw) paper

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\documentclass[twoside]{book}
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            top=54pt, left=56pt, head=18pt, headsep=15pt, footskip=32pt]{geometry}
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\fancyfoot[CE,CO]{\large\sffamily PM10}
\IfFileExists{../papers-final/PM10.pdf}{%
  \includepdf[pages=-, scale=1.0,
             pagecommand={}]{../papers-final/PM10.pdf}%
  {\Huge\mbox{}vfill
  \centering\textsf{\textbf{PAPER NOT YET RECEIVED}}
  vfill}
}\end{document}
```

## »\IfFileExists« ensures that there is at least a paper with a note

```

\documentclass[twoside]{book}
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   \centering\textsf{\textbf{PAPER NOT YET RECEIVED}}
   \vfill}
}
\end{document}

```

## »pagenumber« is set after checking/counting all pages

```

\documentclass[twoside]{book}
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  {\Huge\mbox{} \vfill
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  \vfill}
}
\end{document}

```



## »path« information are set in the config file

```
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  {\Huge\mbox{} \vfill
   \centering\textsf{\textbf{PAPER NOT YET RECEIVED}}
   \vfill}
}
\end{document}
```

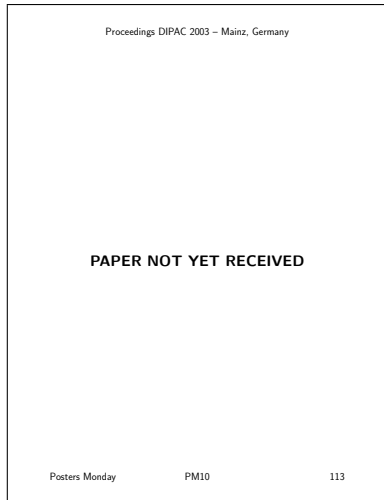
## »scaling« is determined by maximum of crop/media-box sizes

```
\documentclass[twoside]{book}
\usepackage[papersize={595pt,792pt}, body={ 483pt, 680pt},
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  {\Huge\mbox{} \vfill
   \centering\textsf{\textbf{PAPER NOT YET RECEIVED}}
   \vfill}
}
\end{document}
```

What happens, if you compile this T<sub>E</sub>X script without the necessary pdf-file?

You only get the "missing" note.



What happens, if you compile this T<sub>E</sub>X script without the necessary pdf-file?

You only get the "missing" note.

The text is configurable in the config file.

And if it's there, you get. . .

Proceedings DIPAC 2003 – Mainz, Germany

## CHARACTERIZATION OF FAST FARADAY CUPS AT THE ELEETRA LINAC

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### Abstract

Since several years, the Diagnostic Group at Laboratori Nazionali di Legnaro (LNL) has been designing Fast Faraday Cups (FFC) to be used on their Heavy Ion Accelerator. Latest developments in this field include a Stripline FFC, jointly developed with the Spallation Neutron Source (SNS). A collaborative partnership has been set-up between LNL and the ELEETRA Laboratory to fully characterize new FFCs, using the 1GeV electron Linac in operation at the ELEETRA Sincrotrone Light Source. Two FFCs, the stripline FFC, built at SNS, and a coaxial FFC, made at LNL, have been installed at ELEETRA who provided the wideband data acquisition and the remote control of the measurement. The first measurements, carried out using a 1GHz oscilloscope, have allowed the proper set-up of the instrument remote control as well as a low jitter triggering system, synchronous with the injected electrons. Wideband measurements were performed using oscilloscopes with bandwidths up to 2GHz, whereas the bandwidth of the Stripline FFC has been estimated to be roughly 2GHz. A complete set of tests was carried out both on the coaxial FFC and on the stripline FFC. Moreover, thanks to the information provided by these wideband measurements, the Linac working point has been further optimized as well as the injection process into the ELEETRA Storage Ring.

### INTRODUCTION

The ELEETRA Linac [1] is in operation since 1992 as injector of the ELEETRA Storage Ring, providing a 15GeV electron beam. Since 1998 [2] the Linac has also been used periodically as a "test facility" both for neutral irradiation experiments and for testing diagnostic equipments [3]. The characterization of the new Fast Faraday Cups was carried out in the frame of this second activity.

The FFCs, designed to have information on beam temporal structures, have been developed at LNL. For several years to measure the bunch length of ion beams. The experience gained in that field also yielded a collaboration with the SNS project at Oak Ridge, where a strip line FFC has been developed to measure the bunch length out of the low energy ( $E=2.5MeV$  of H) section of the machine.

### The ELEETRA Linac branching structure

The branching section of the ELEETRA Linac, shown in Fig. 1, includes:

- a 500MHz Sub Harmonic Chopper (TM<sub>10</sub> deflecting cavity)
- a 500MHz Buncher (TM<sub>100</sub> pill box cavity)
- 3GHz Pre-Buncher (TM<sub>100</sub> pill box cavity)
- 3GHz Buncher (0.4m long 2.75 SW accelerating section).

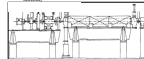


Figure 1: Schematic of the ELEETRA Linac pre-injector: C: Gun, C: Chopper, FB: Pre-buncher @500MHz, PB1: Pre-buncher @3GHz, B: Buncher @3GHz.

With a proper setting of the parameters (amplitude and phase of the cavities) this configuration allows to select and fill a pure 500 MHz bucket of the Storage ring, in single bunch mode. This means that at the Linac exit all the charge is compressed in less than 1 nsec with a 3 GHz line structure of the beam (2 or 3.5-Band micro-bunches, spaced by 330 ps). As we have observed with these measurements, changing the relative phases between the 500MHz cavities and the 3GHz ones, it is possible to change the number and the relative amplitude of the 5-Band micro-bunches.

### THE FAST FARADAY CUPS

The FFC station, built at LNL and holding the two FFCs, has been installed on the Linac. User port at 1GeV (Fig. 2). An already available fluorescence screen located upstream the station has been used for alignment purposes and for checking the electron beam focusing.



Figure 2: View of the FFC station installed on the Linac. User port at 1GeV. The cable of the coaxial FFC is visible in the background. On the right hand side, there is the linear translation stage of the Stripline FFC.

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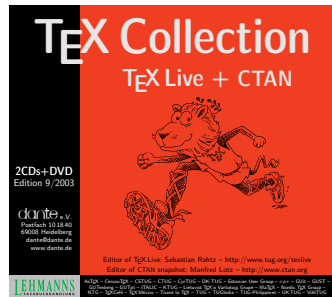
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