New Allpix Squared Documentation and Website

Stephan Lachnit

3rd Allpix Squared User Workshop (11.05.2021)

Problems with the current documentation

- Looks awesome in PDF, but website has rendering issues
- LaTeX is not WYSIWYG:
  - Needs build to review changes e.g. from merge requests
  - Documentation can't be previewed in GitLab nicely
- Inconsistencies:
  - Different formats: some parts are Markdown, some LaTeX
  - Separated website: hugo (news) vs LaTeX (docs) vs Doxygen (API ref)

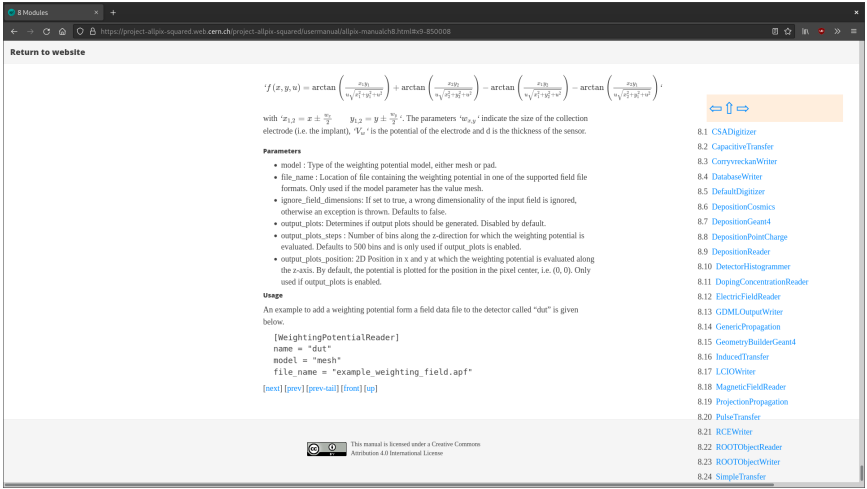

Figure 1: Sidebar not scrolling down: not all entries are visible

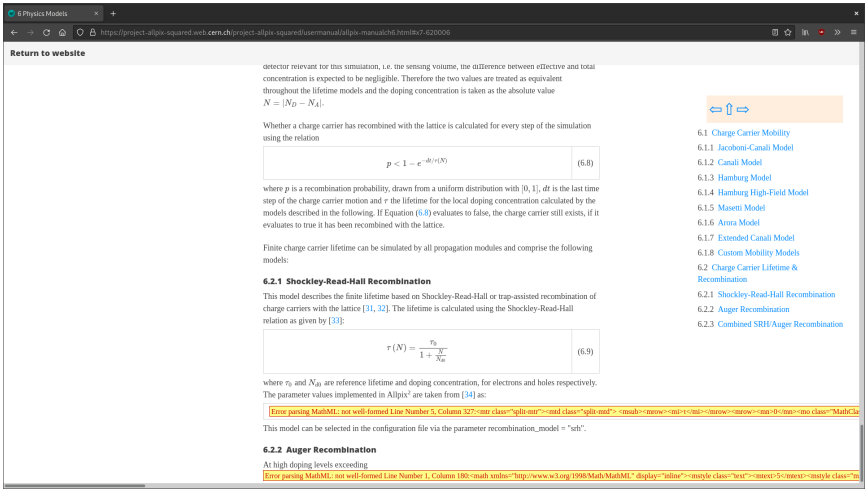

Figure 2: Some equation not rendering, preventing to scroll to the bottom

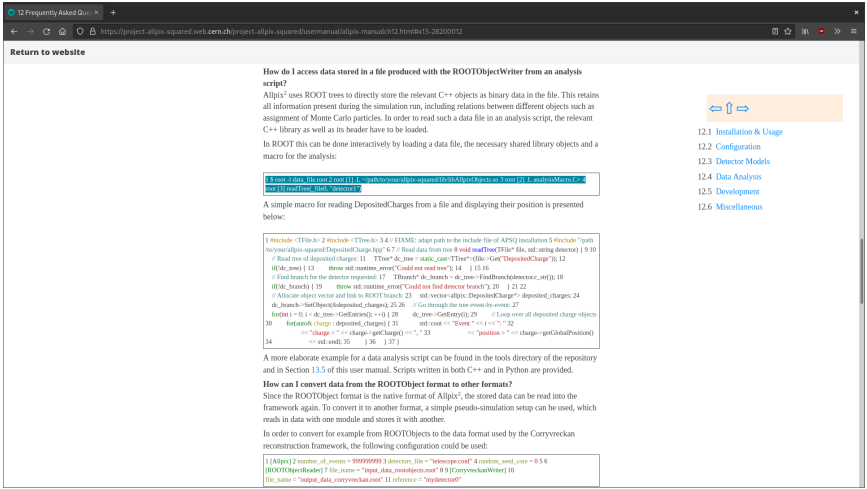

Figure 3: Code blocks missing newlines, line numbers are in copied code

Current website setup

- Main website (landing page, news, etc) via hugo
- API reference created with Doxygen and rendered to HTML
- Main documentation in LaTeX
- Module & example READMEs converted from Markdown to LaTeX via pandoc
- Final LaTeX document rendered to HTML page via TeX4ht
- HTML documentation and API reference pasted into hugo webdirectory

New Website

- Documentation ported to Markdown [1]
- Using hugo for news *and* documentation
- Docsy theme [2] (made for technical documentations)
- Consistent theme across website, no more rendering issues
- New features, e.g. pretty warning boxes, search

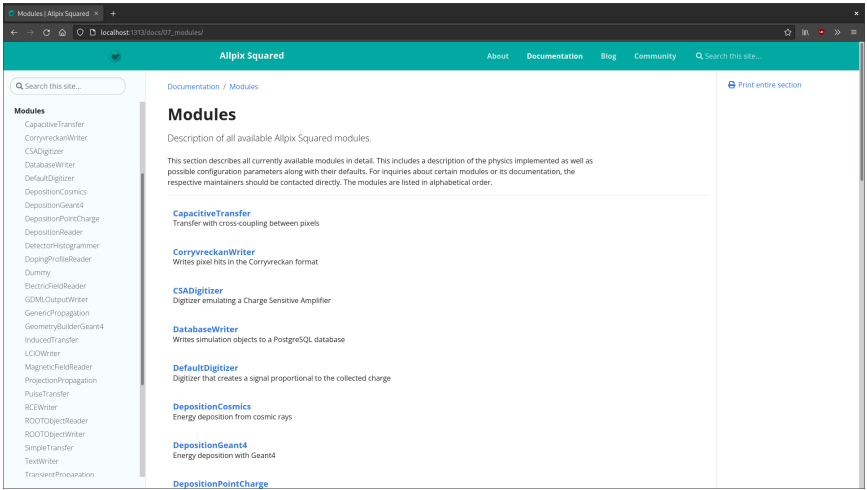

Figure 4: Separate chapter overview, scrollable sidebar

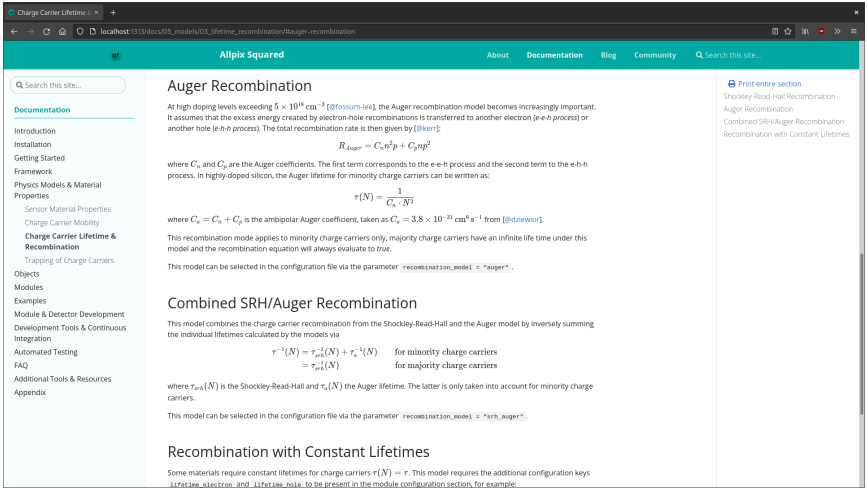

Figure 5: No more broken math

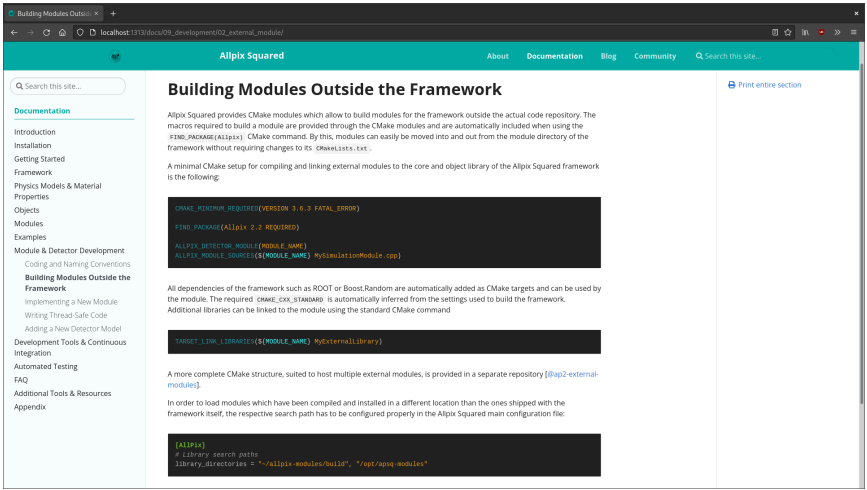

Figure 6: Beautiful code blocks

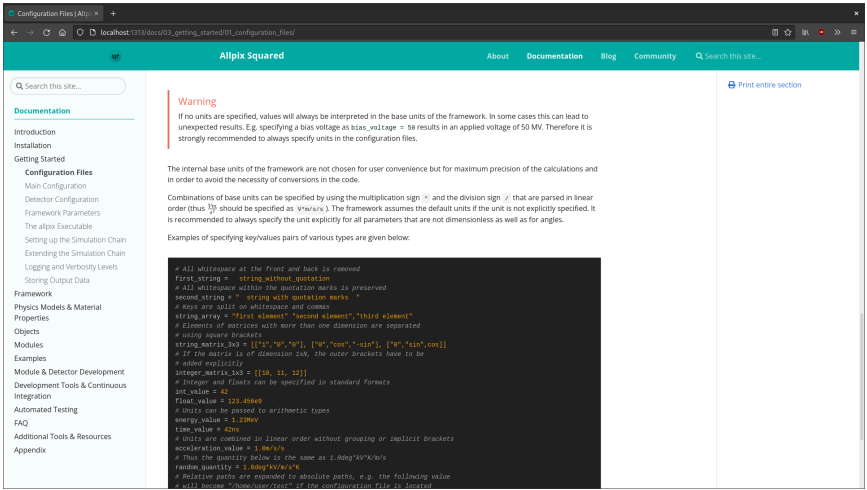

Figure 7: Fancy warnings

Live Demo

To try it yourself, you only need `git` and `hugo` [3]:

```
git clone --recurse-submodules https://gitlab.com/stephanlachnit/apsq-docs-hugo.git
cd apsq-docs-hugo
hugo server
```

Now you can explore the page by visiting `http://localhost:1313/`.

New format: Markdown

- Almost WYSIWYG
- Native to hugo
- Nicely rendered in GitLab
- Natively supports code highlighting
- Using GitLab Flavored Markdown (GLFM) [4] for math

How to write Markdown?

```
# This is a large caption in Markdown

## This is also a caption but a bit smaller

Text in Markdown can be *italics* or **bold**.
Markdown supports [hyperlinks](https://cern.ch/allpix-squared/).

Markdown support code highlighting `inline` and via blocks:

```cpp
auto hist = CreateHistogram<TH1D>("name", "title", 100, 0., 100.);
```
```

How to write Markdown?

Figure 8: How the previous Markdown code renders on GitLab

How to write GLFM?

````
---
# GLFM and hugo support front matter written in YAML
title: "This is the title for the corresponding webpage"
---

GLFM supports LaTeX inline math like $`\frac{1}{2}`$. GLFM also
supports free standing equations:

```math
\mu_e^{-1}(E) = 1 / \mu_{0,e} + E / v_{sat}
```
````

How to write GLFM?

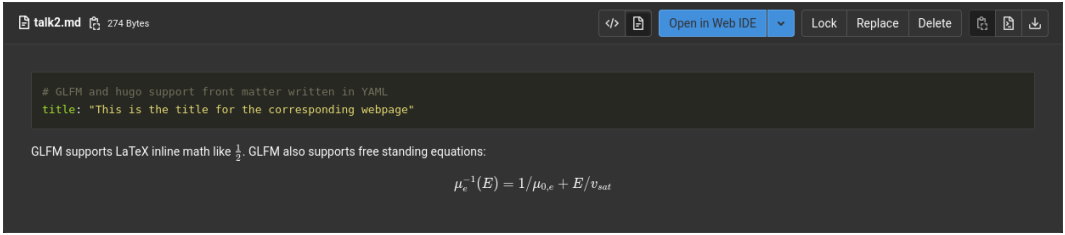

Figure 9: How the previous GLFM code renders on GitLab

LaTeX features missing in GLFM

- Automatic chapter and section numbering
- Proper captions for figures
- Citations using a bibliography
- `siunitx` (not supported by KaTeX)

What about the PDF?

- PDF will be created by converting GLFM to LaTeX via pandoc [5]
- Sadly GLFM is not support by pandoc yet
- Some problems (most can be fixed with pandoc filters or regex):
  - GLFM's math format is not recognized
  - YAML front matter is ignored
  - Internal references are converted to `\href`
  - Pictures don't have max width / height set
  - Warning boxes don't work

State of the new implementaion

- GitLab MR !734
- Documentation fully converted
- Many tiny (already existing) mistakes fixed
- Website prototype working
- TODOs:
  - Fix CMake to recognize new files
  - Clean up hugo tree and create MR for website repo
  - Adjust CI to trigger correct pipelines for deployment
- Expect the new documentation to land in `master` in the next weeks!

Things to come

- Fix wrongly converted Markdown in LaTeX source for the PDF
- Improved quick start, about page, screenshots page, etc.
- Documentation for each version (starting from the next one)
- Doxygen API Reference in hugo with Doxybook2 [6]

References

[1] John Gruber. *Markdown*. 2004. URL: https://daringfireball.net/projects/markdown/.
[2] *Docsy*. URL: https://www.docsy.dev/ (visited on 2022-05-03).
[3] *hugo*. URL: https://gohugo.io/ (visited on 2022-05-03).
[4] *GitLab Flavored Markdown (GLFM)*. URL: https://docs.gitlab.com/ee/user/markdown.html (visited on 2022-05-03).
[5] John MacFarlane. *pandoc*. URL: https://pandoc.org/ (visited on 2022-05-03).
[6] *Doxybook2*. URL: https://github.com/matusnovak/doxybook2 (visited on 2022-05-03).

Internal references in Markdown

```
# Some Chapter

## Some section

[This is a reference to this chapter.](#some-chapter)

[This is a to the section below.](#another-section)

## Another section

[Reference to chapter in other file.](./file.md#another-chapter)
```

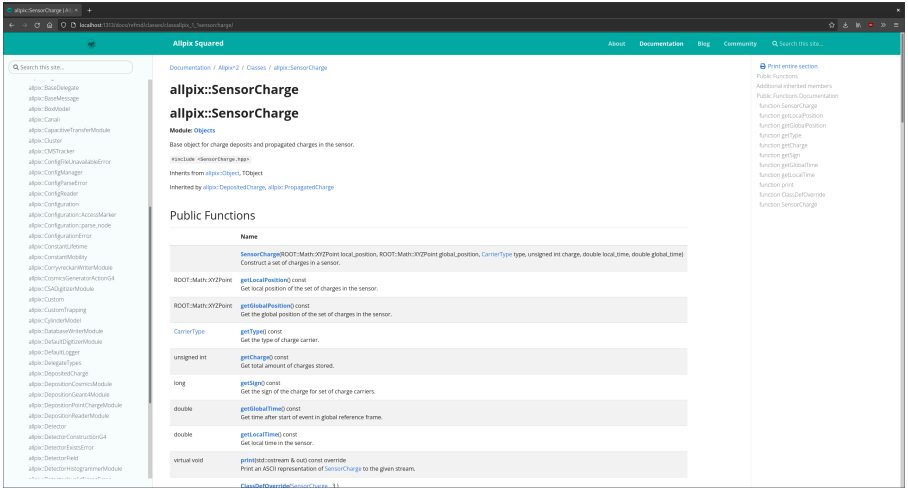

Figure 10: API Reference in Docsy via Doxybook2

Lua filter for recognizing GLFM math with pandoc

```lua
-- From https://gist.github.com/lierdakil/00d8143465a488e0b854a3b4bf355cf6#file-gitlab-math-lua

function Math(el)
    if el.mathtype == "InlineMath" then
        if el.text:sub(1,1) == '`' and el.text:sub(#el.text) == '`' then
            local text = el.text:sub(2,#el.text-1)
            return pandoc.Math(el.mathtype, text)
        else
            local cont = pandoc.read(el.text)
            return { pandoc.Str("$") } .. cont.blocks[1].content .. { pandoc.Str("$") }
        end
    end
end

function CodeBlock(el)
    if el.classes[1] == "math" then
        return pandoc.Para({ pandoc.Math("DisplayMath", el.text) })
    end
end
```