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# **scibeam Documentation**

***Release 0.1.1***

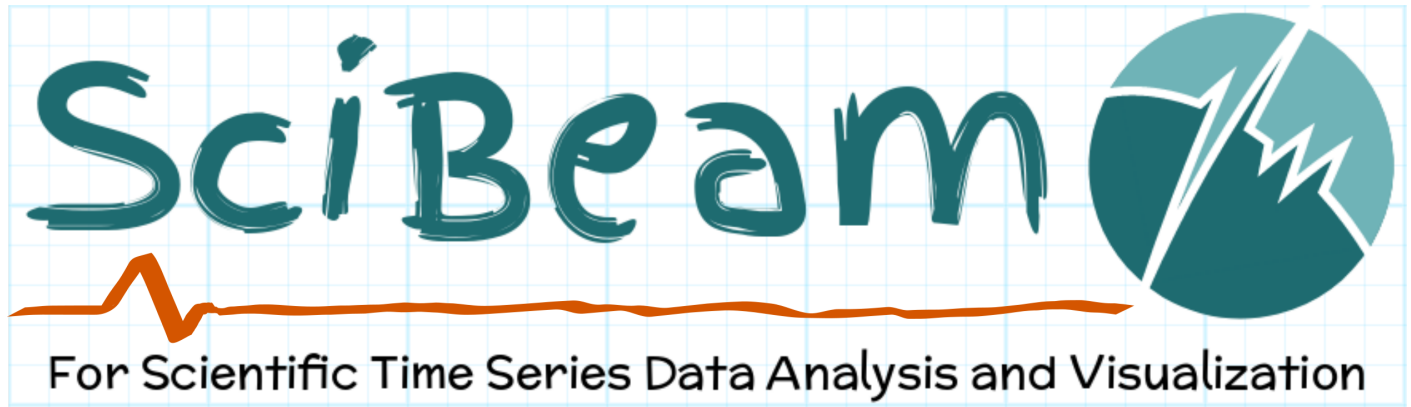
**Yu Lu**

**Aug 31, 2018**



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SciBeam is a python package build on top of pandas, numpy, scipy and matplotlib. It is aimed for quick and easy scientific time-series data analysis and visualization in physics, optics, mechanics, and many other STEM subjects.

In the context of scientific data analysis, there are a lot of situations that people have to deal with time-series data, such as time dependent experiment(e.g. temperature measurement), dynamic processes(e.g. beam propagation, chemical reaction), system long/short term behavior(e.g. noise), etc. Quite often is that data taking and result analysis is gaped by some time and effort, which could result in complains or regrets during the data analysis, like “I wish I took another measurement of ... so than I could explain why ...”. As such, the general guideline of scibeam is to bridge the gap between measurement and data analysis, so that time-series related experiment can be done in a more guided way.

The basic features of scibeam include but not limited to: beam propagation, single or multi-dimentional time deperdent measurement, data file auto indexing, noise reduction, peak analysis, numerical fittings, etc.

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**Note:** scibeam doesn't support python 2.7, make sure you have the right python version ( $\geq 3.4$ ).

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### 1.1 This document

This document is created using [Sphinx](#) and [autodoc](#). The general rule of the static html is configured in [reStructuredText](#) and api document is generated by [Sphinx-apidoc](#), configure in `conf.py`.

The general html structure looks like below:

```
html/
├── about.html
├── conf.html
├── genindex.html
├── index.html
├── install.html
├── _modules
│   ├── index.html
│   └── scibeam
│       ├── core
│       │   ├── base.html
│       │   ├── common.html
│       │   ├── descriptor.html
│       │   ├── formatter.html
│       │   ├── gaussian.html
│       │   ├── numerical.html
│       │   ├── peak.html
│       │   ├── plot.html
│       │   ├── regexp.html
│       │   ├── tofframe.html
│       │   └── tofseries.html
│       └── tests
│           ├── test_base.html
│           ├── test_common.html
│           ├── test_formatter.html
│           └── test_imports.html
```

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```
├── test_regex.html
├── test_tofseries.html
├── modules.html
├── objects.inv
├── py-modindex.html
├── scibeam.core.html
├── scibeam.html
├── scibeam.tests.html
├── search.html
├── searchindex.js
├── setup.html
├── _sources
│   ├── about.rst.txt
│   ├── conf.rst.txt
│   ├── index.rst.txt
│   ├── install.rst.txt
│   ├── modules.rst.txt
│   ├── scibeam.core.rst.txt
│   ├── scibeam.rst.txt
│   ├── scibeam.tests.rst.txt
│   ├── setup.rst.txt
│   ├── structure.rst.txt
│   └── tutorial.rst.txt
├── _static
│   ├── ajax-loader.gif
│   ├── alabaster.css
│   ├── basic.css
│   ├── comment-bright.png
│   ├── comment-close.png
│   ├── comment.png
│   ├── css
│   │   ├── badge_only.css
│   │   └── theme.css
│   ├── custom.css
│   ├── doctools.js
│   ├── documentation_options.js
│   ├── down.png
│   ├── down-pressed.png
│   ├── file.png
│   └── fonts
│       ├── fontawesome-webfont.eot
│       ├── fontawesome-webfont.svg
│       ├── fontawesome-webfont.ttf
│       ├── fontawesome-webfont.woff
│       ├── fontawesome-webfont.woff2
│       └── Lato
│           ├── lato-bold.eot
│           ├── lato-bolditalic.eot
│           ├── lato-bolditalic.ttf
│           ├── lato-bolditalic.woff
│           ├── lato-bolditalic.woff2
│           ├── lato-bold.ttf
│           ├── lato-bold.woff
│           ├── lato-bold.woff2
│           ├── lato-italic.eot
│           ├── lato-italic.ttf
│           └── lato-italic.woff
```

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```

├── lato-italic.woff2
├── lato-regular.eot
├── lato-regular.ttf
├── lato-regular.woff
├── lato-regular.woff2
├── RobotoSlab
│   ├── roboto-slab-v7-bold.eot
│   ├── roboto-slab-v7-bold.ttf
│   ├── roboto-slab-v7-bold.woff
│   ├── roboto-slab-v7-bold.woff2
│   ├── roboto-slab-v7-regular.eot
│   ├── roboto-slab-v7-regular.ttf
│   ├── roboto-slab-v7-regular.woff
│   └── roboto-slab-v7-regular.woff2
├── jquery-3.2.1.js
├── jquery.js
├── js
│   ├── modernizr.min.js
│   └── theme.js
├── minus.png
├── plus.png
├── pygments.css
├── searchtools.js
├── underscore-1.3.1.js
├── underscore.js
├── up.png
├── up-pressed.png
├── websupport.js
├── structure.html
└── tutorial.html

```

11 directories, 101 files

## 1.2 reStructuredText Sturcture

The reStructuredText files are the source that these htmls are build on top of. Most of the text related .rst files are wrote in the corresponding mark up formart, other module related .rst are build using autodoc, which automatically looks in to the doc strings in python source files.

In this project, the document style in the pyhon source files are following [numpy style](#), which is rendered by Spnhinx extension [napoleon](#).

The structure of .rst folder structure:

```

├── about.rst
├── conf.py
├── index.rst
├── install.rst
├── modules.rst
├── scibeam.core.rst
├── scibeam.rst
├── scibeam.tests.rst
├── _static
└── structure.rst

```

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```
└─ _templates
```

```
2 directories, 11 files
```

## 1.3 Package structure

The package structure of scibeam is

```
scibeam
├─ core
│   ├── base.py
│   ├── common.py
│   ├── descriptor.py
│   ├── dictfunc.py
│   ├── formatter.py
│   ├── gaussian.py
│   ├── __init__.py
│   ├── numerical.py
│   ├── peak.py
│   ├── plot.py
│   ├── regexp.py
│   ├── tofframe.py
│   └── tofseries.py
├─ data
│   ├── examples
│   └── test
├─ __init__.py
├─ tests
│   ├── __init__.py
│   ├── __pycache__
│   ├── test_base.py
│   ├── test_common.py
│   ├── test_formatter.py
│   ├── test_imports.py
│   ├── test_regexp.py
│   └── test_tofseries.py
└─ util
    ├── folderstruct.py
    ├── __init__.py
    ├── io.py
    ├── multiframe.py
    └── pipeline.py
```

10 directories, 34 files

Where:

- core: main part of the package
- tests: unittests
- util: extra add ons for the package
- data: test data and example data files

Install scibeam is easy, one can choose either install using pypi or from [source code](#) using python setuptools.

## 2.1 Requirements

The scibeam package requires:

- Python(>= 3.4)
- Numpy
- Scipy
- Pandas
- matplotlib

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**Note:** scibeam doesn't support python 2.7, make sure you have the right python version (>=3.4).

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## 2.2 Using PyPI

Scibeam is available on [PyPI](#), one can install under python3 environment using:

```
pip install scibeam
```

Scibeam can then be imported as:

```
import scibeam
```

## 2.3 Using Setuptools

To install using python setuptools, simply clone the source code:

```
git clone git@github.com:SuperYuLu/SciBeam.git
```

Then change into the SciBeam folder:

```
cd SciBeam
```

Under SciBeam folder, install by typing:

```
python setup.py install
```

scibeam package name should be then available in the python environment, to import:

```
import scibeam
```

or:

```
from scibeam import *
```

## CHAPTER 3

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How to use

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How to use





## CHAPTER 4

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scibeam.core package

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### 4.1 Submodules

#### 4.2 scibeam.core.base module

#### 4.3 scibeam.core.common module

#### 4.4 scibeam.core.descriptor module

#### 4.5 scibeam.core.dictfunc module

#### 4.6 scibeam.core.formatter module

#### 4.7 scibeam.core.gaussian module

#### 4.8 scibeam.core.numerical module

#### 4.9 scibeam.core.peak module

#### 4.10 scibeam.core.plot module

#### 4.11 scibeam.core.regex module

#### 4.12 scibeam.core.tofframe module

#### 4.13 scibeam.core.tofseries module

#### 4.14 Module contents



As a open source project, scibeam is under active development towards version 1.0, thus we need contributors from the community.

### 5.1 Steps

- Read the [documents](#)
- Join the slack channel(<https://scibeam.slack.com>)
- Report issue / bug on [Github](#)
- Look for open [issues](#)
- Create new pull request

### 5.2 Help needed

- Write unittest for better coverage
- Finish document “how to use” part
- Add slack channel badge to Readme
- Add more file read in format support
- Add plotly extension for better visualization
- Many more



### 6.1 Submodules

#### 6.2 `scibeam.tests.test_base` module

#### 6.3 `scibeam.tests.test_common` module

#### 6.4 `scibeam.tests.test_formatter` module

#### 6.5 `scibeam.tests.test_imports` module

#### 6.6 `scibeam.tests.test_regex` module

#### 6.7 `scibeam.tests.test_tofseries` module

### 6.8 Module contents



## CHAPTER 7

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### Indices and tables

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- `genindex`
- `modindex`
- `search`