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# **Testbeam Analysis Documentation**

***Release 0.0.1***

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## Contents:

Testbeam analysis is a simple analysis of pixel-sensor data in particle beams. All steps of a complete analysis are implemented with a few independent python functions. If you want to understand the basics of telescope data reconstruction this code might help. If you want to have something fancy to account for thick devices in combination with low energetic beams use e.g. `_EUTelescope_`. Depending on the setup a resolution that is only ~ 15% worse can be achieved with this code. For a quick first impression check the examples in the documentation.

In future releases it is foreseen to make the code more readable and to implement a Kalman Filter to have the best possible track fit results.



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# Installation

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You have to have Python 2/3 with the following modules installed: - cython - tables - scipy - matplotlib - numba

If you are new to Python please look at the installation guide in the wiki. Since it is recommended to change example files according to your needs you should install the module with

```
python setup.py develop
```

This does not copy the code to a new location, but just links to it. Uninstall:

```
pip uninstall testbeam_analysis
```





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### Example usage

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Check the examples folder with data and examples of a Mimosa26 and a FE-I4 telescope analysis. Run `eutelescope_example.py` or `fei4_telescope_example.py` in the example folder and check the text output to the console as well as the plot and data files that are created to understand what is going on. In the examples folder type e.g.:

```
python fei4_telescope_example.py
```



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### Latest commits

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- **DOC** by *DavidLP* at 2017-01-19 09:19:46
- **DOC: mock clusterizer** by *DavidLP* at 2017-01-19 09:13:58
- **DOC: mock tables package** by *DavidLP* at 2017-01-19 09:11:42
- **PRJ: delete, does not work** by *DavidLP* at 2017-01-19 09:06:37
- **MAINT: delete additional tmp files** by *DavidLP* at 2017-01-19 08:27:55
- **PRJ: try fixing rtd** by *DavidLP* at 2017-01-19 08:27:39
- **PRJ: try use anaconda for readthedocs autobuild** by *DavidLP* at 2017-01-18 16:59:03
- **MAINT: adding newlines at the end** by *Jens Janssen* at 2017-01-18 16:46:58
- **PRJ: use new clusterizer version 3.0, also fixes unittests** by *DavidLP* at 2017-01-18 15:13:33
- **MAINT** by *DavidLP* at 2017-01-18 15:11:39



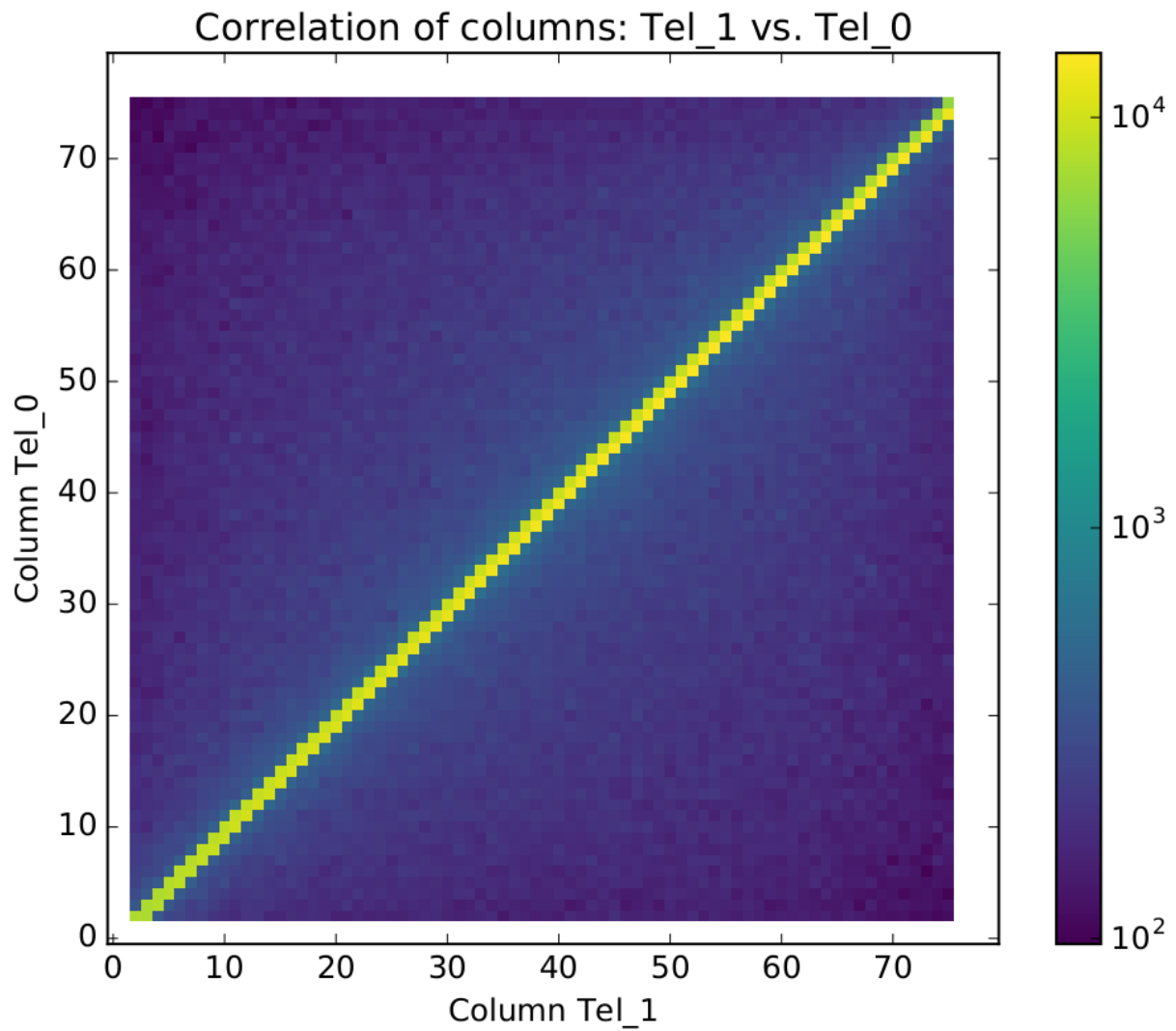
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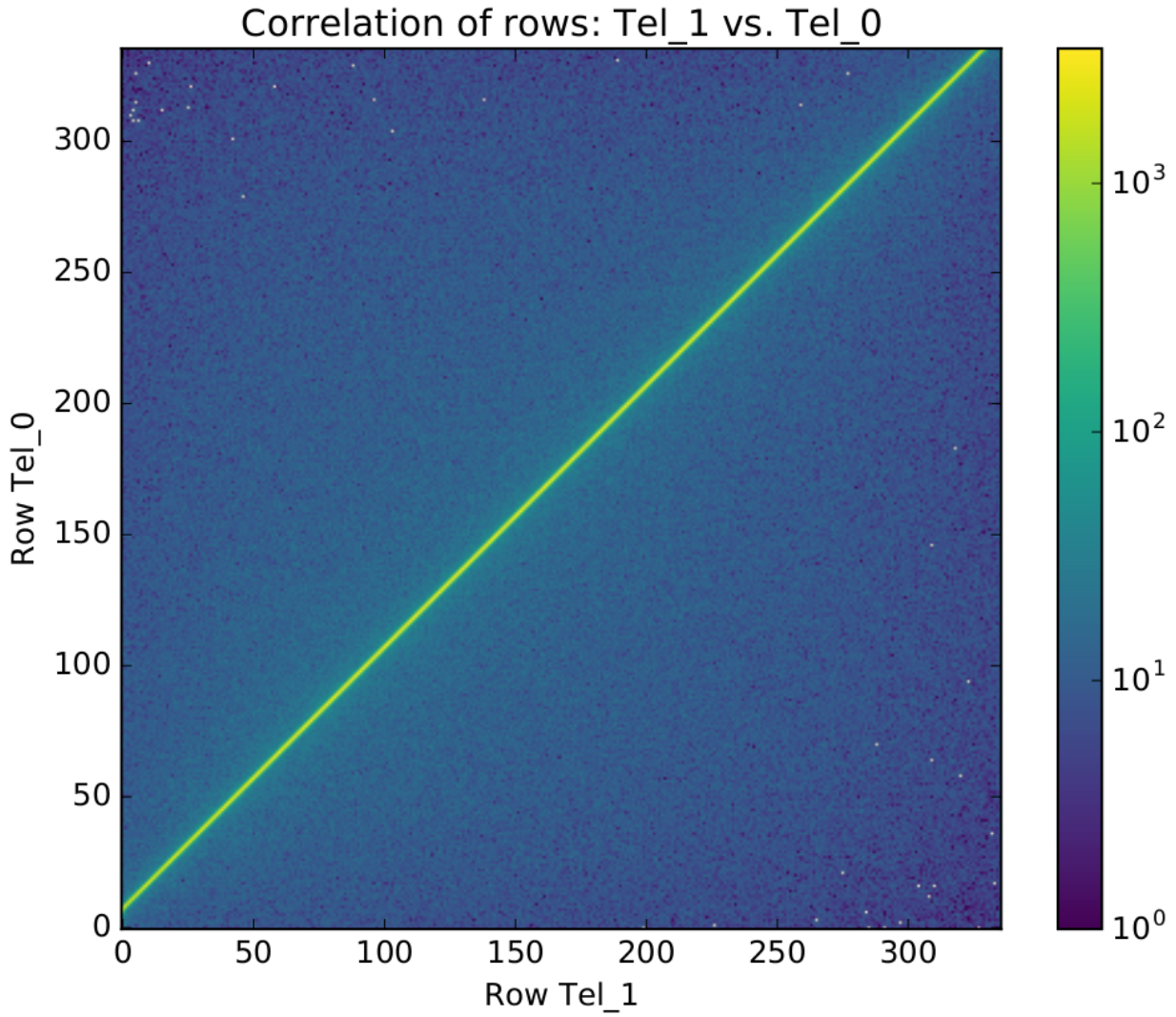
### Examples

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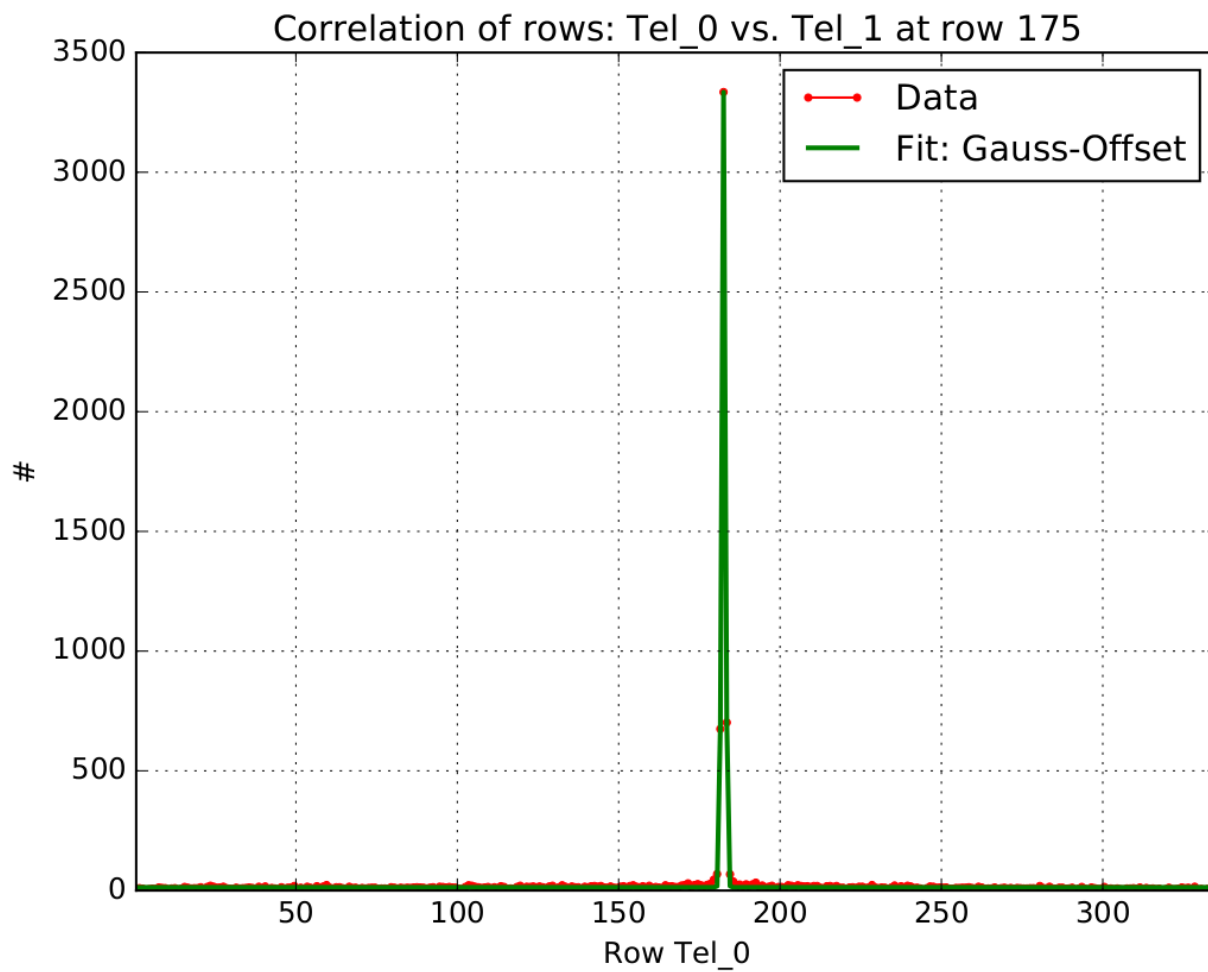
There are several examples available that cover different setups. These examples are a good starting point to get to know *Testbeam Analysis*.

## 4.1 ATLAS FE-I4 telescope

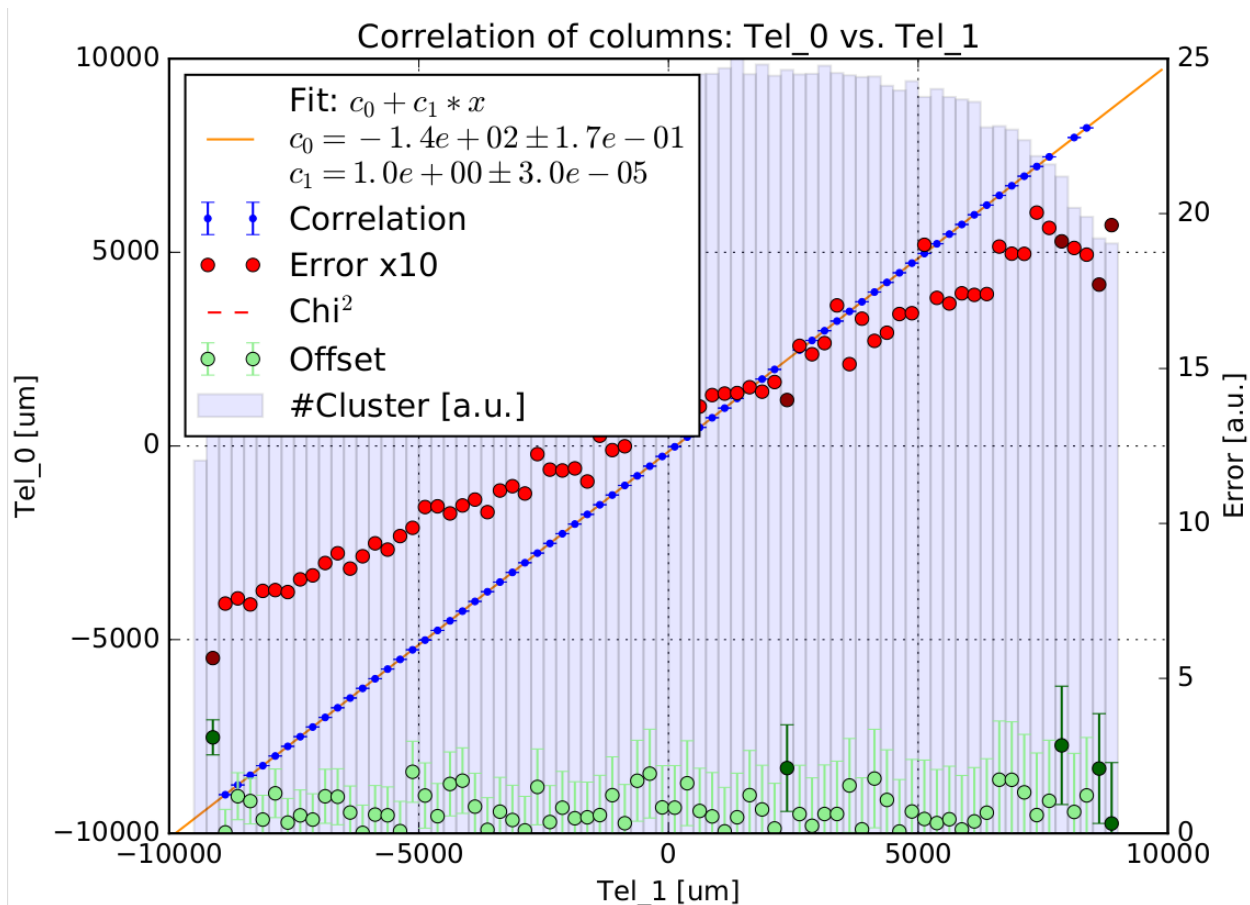




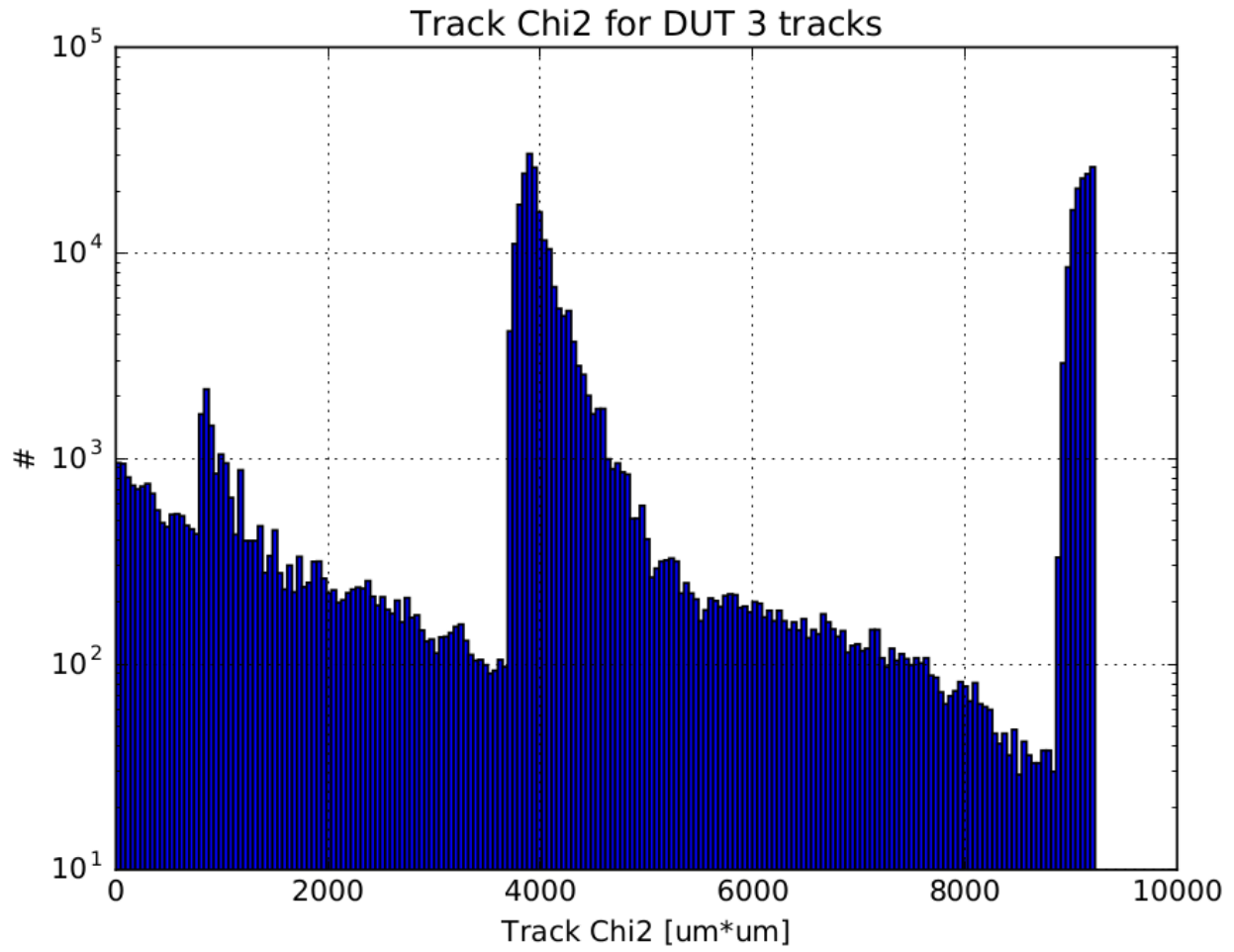
Original correlation pdf output



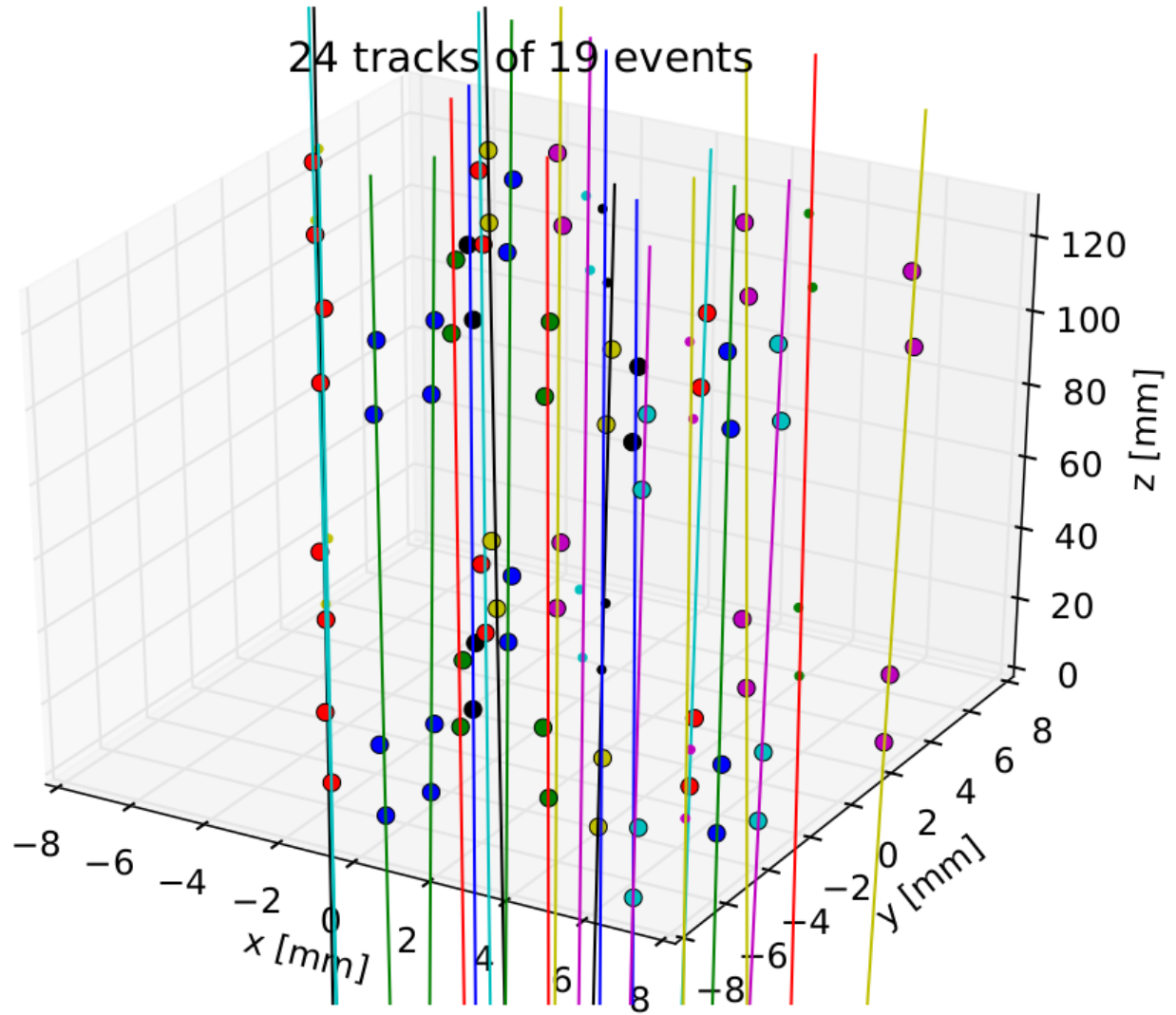




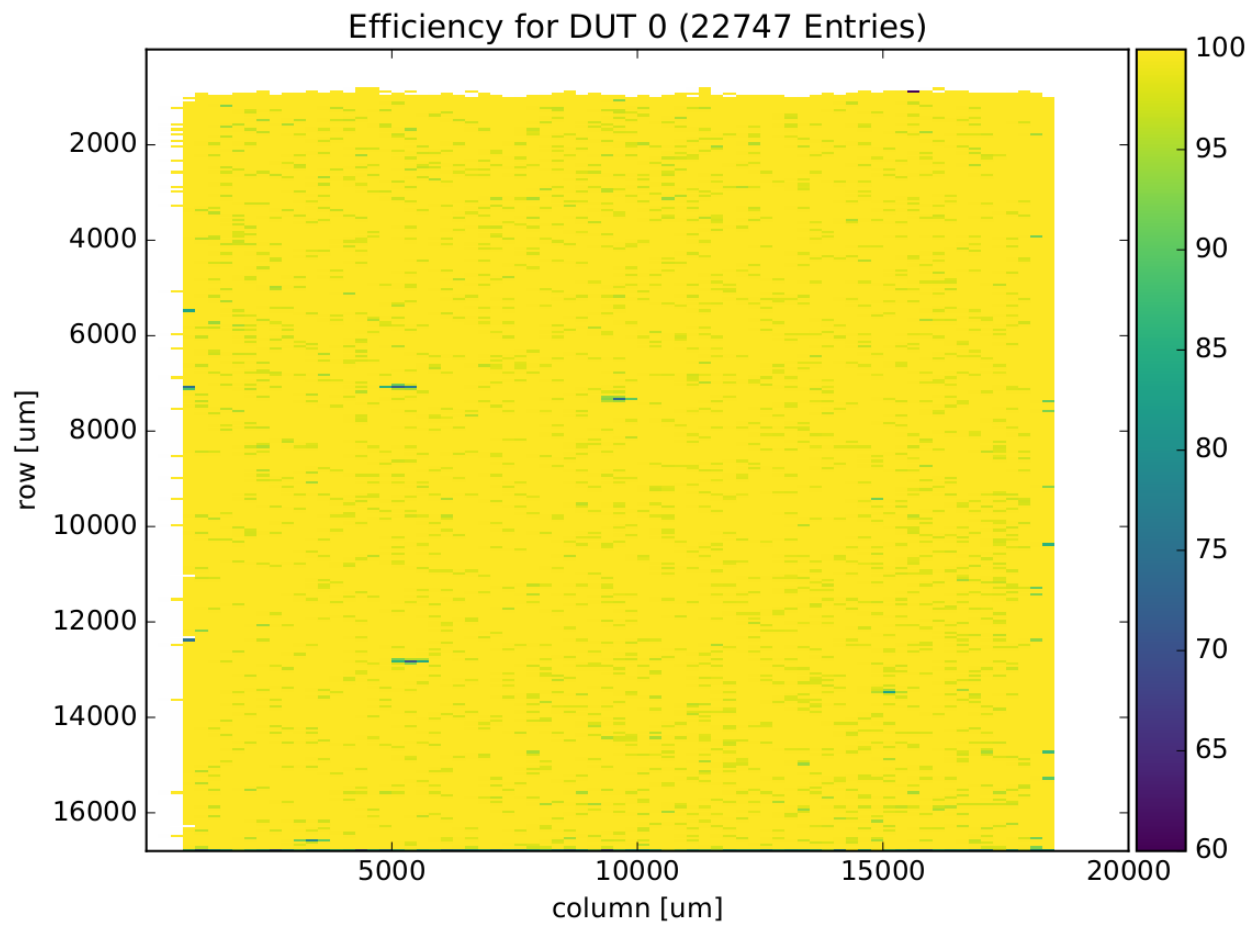
Original pre-alignment pdf output



Original track fitting pdf output



Original event plot pdf output



Original efficiency pdf output

The major analysis steps are divided into these modules:

## **5.1 hit\_analysis**

### **5.1.1 Methods**

## **5.2 dut\_alignment**

### **5.2.1 Methods**

## **5.3 track\_analysis**

### **5.3.1 Methods**

## **5.4 result\_analysis**

### **5.4.1 Methods**



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## Indices and tables

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