Plan of the school
What's new in BornAgain

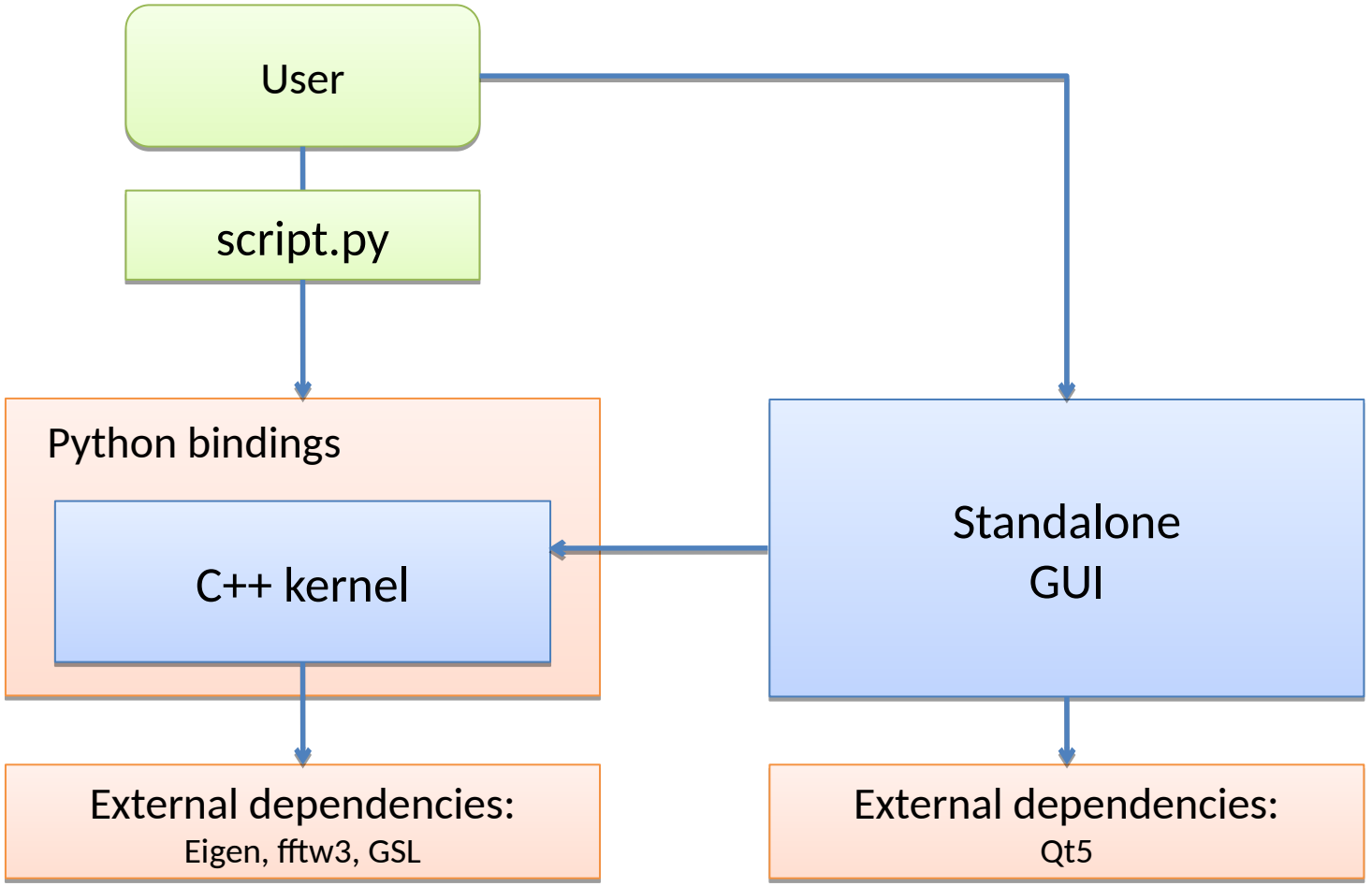
Gennady Pospelov
Jülich Centre for Neutron Science at MLZ

BornAgain school and user meeting
Garching, December 2018

day_1

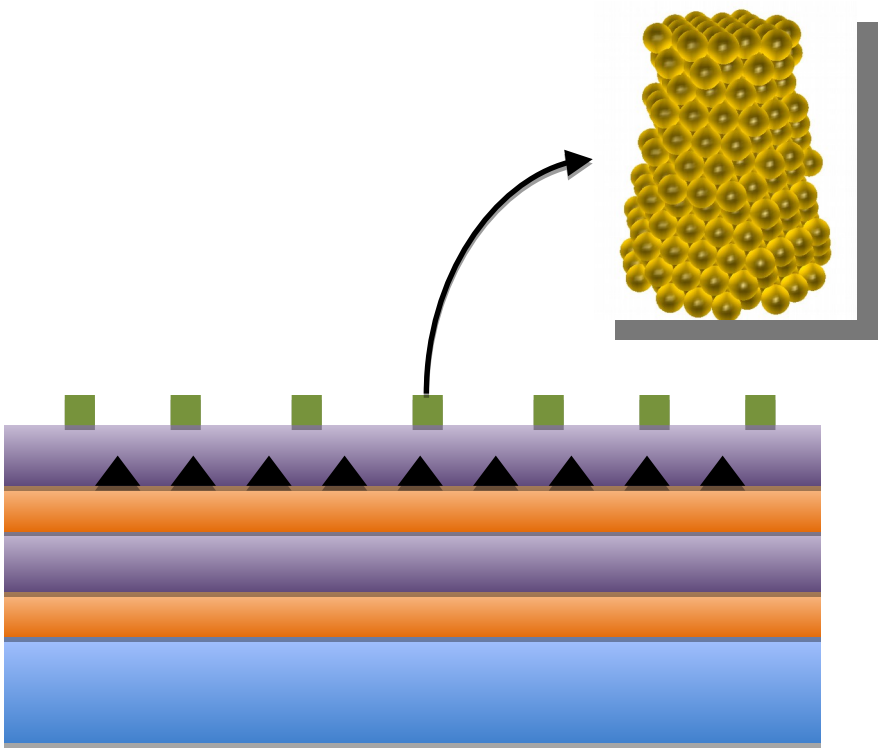
Software architecture

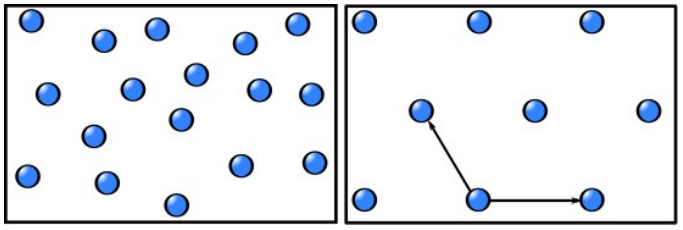
- Open source, GPL3 license, 200k lines of code
- Multi platform: Windows, Mac OS, Linux
- C++ kernel for simulation/fitting, Python bindings, GUI

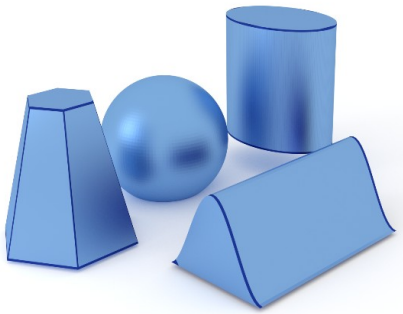


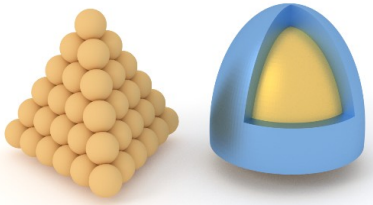
Functionality overview

- X-rays, non-polarized and polarized neutrons
- Arbitrary number of layers
- Rough interfaces
- Simple and composite particles
- Correlated positions
- Nanoparticle assemblies
- Off-specular and specular setups
- Instrument effects

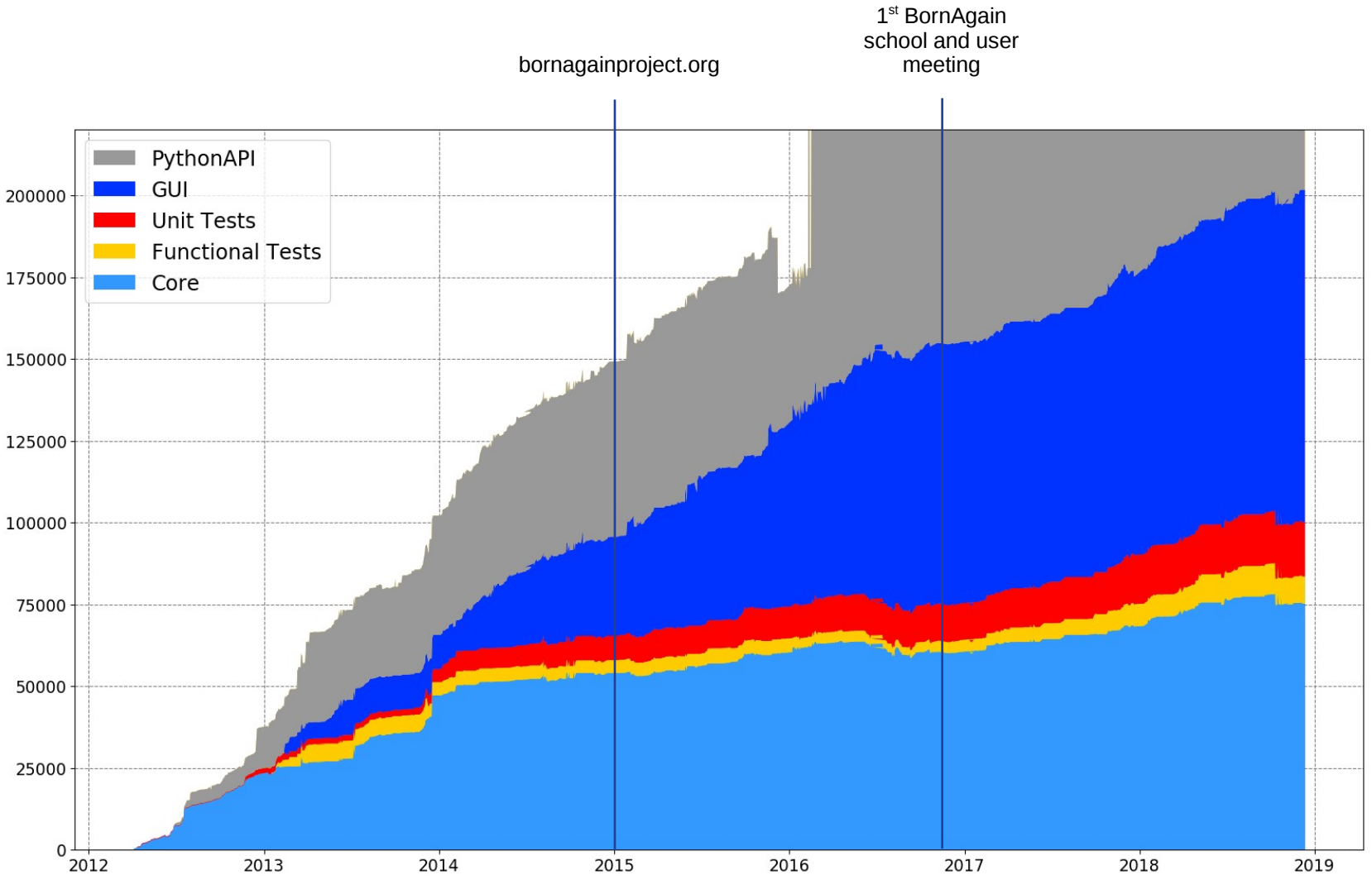








Lines of code



Release history

Version	Date	Features
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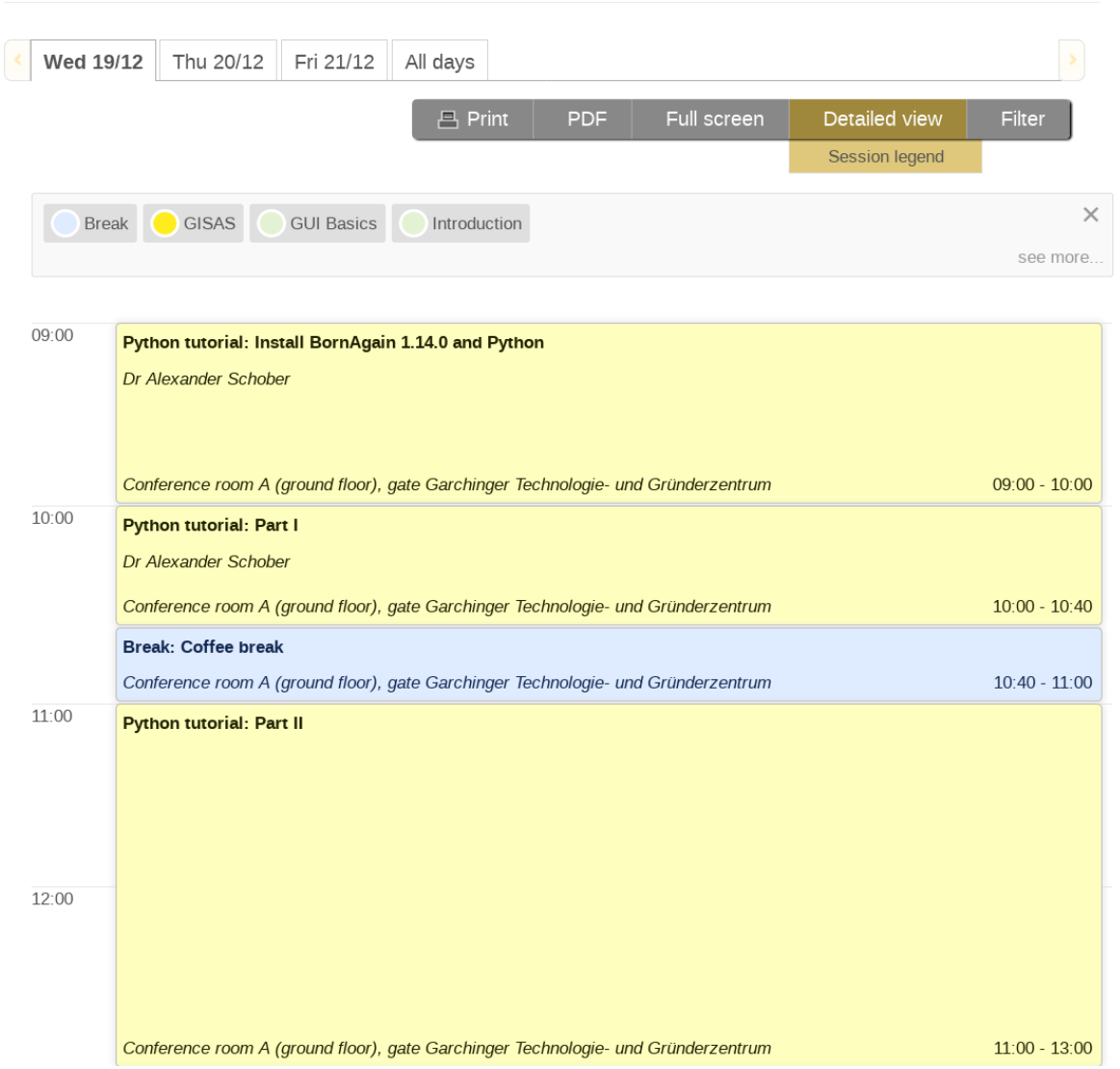
School program

https://indico.frm2.tum.de/event/150/



Plan of the school

Day_1 (today)

- GUI overview
  - setup instrument, sample construction, 3D-view, simulations
- GISAS theory
- GUI basics I
  - Particle positioning, rotation, embedded particles, particle composition
  - Particles with size distribution
- GUI basics II
  - Interference functions, graded interfaces, roughness
- GUI basics III
  - Fitting in GUI
- User session

Plan of the school

Day_2 (tomorrow)

- Python API
  - Simulation from Python, complex lamellar example, new fitting API
- GISAS for soft matter
  - Lecture of Prof. P. Müller-Buschbaum
- Introduction to reflectivity I
  - Materials, theory
- Introduction to reflectivity II
  - Simulate/fit reflectivity from GUI
  - Reflectivity via Python API
- Polarized neutrons
  - Polarized SANS/GISANS, magnetic materials
- User session
- Optional “fit your own data”

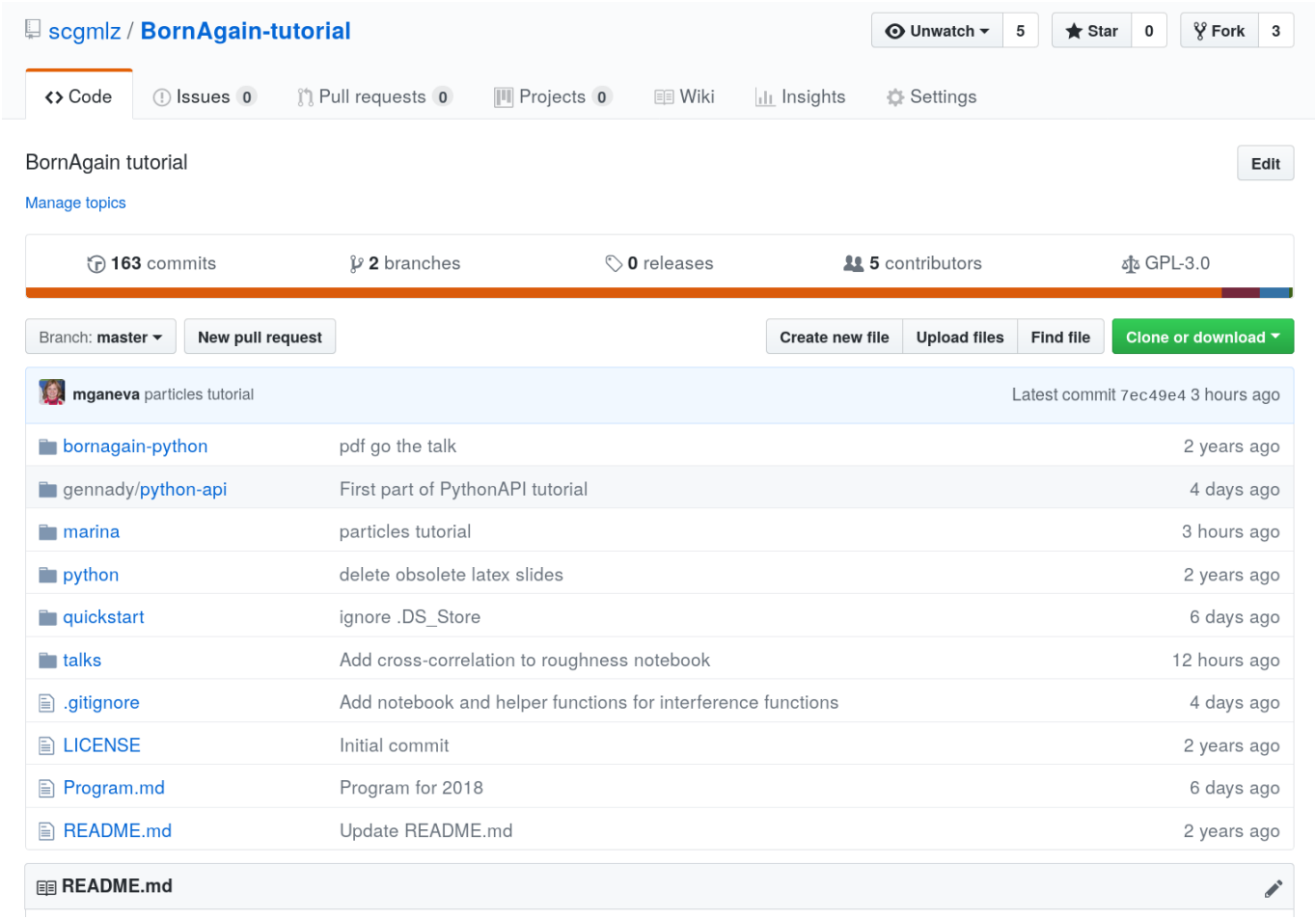
Plan of the school

Day_3 (Friday)

- Introduction to git and GitHub
- Complex samples
  - Mesocrystals, large particles, supperlattice
  - Density gradients, diffuse scattering
- Advanced geometry
  - Evanescent wave, off-specular simulation
- Advanced simulations with BornAgain API
  - Data generation for machine learning
  - Making GISAS movies

School materials

https://github.com/scgmlz/BornAgain-tutorial



School materials

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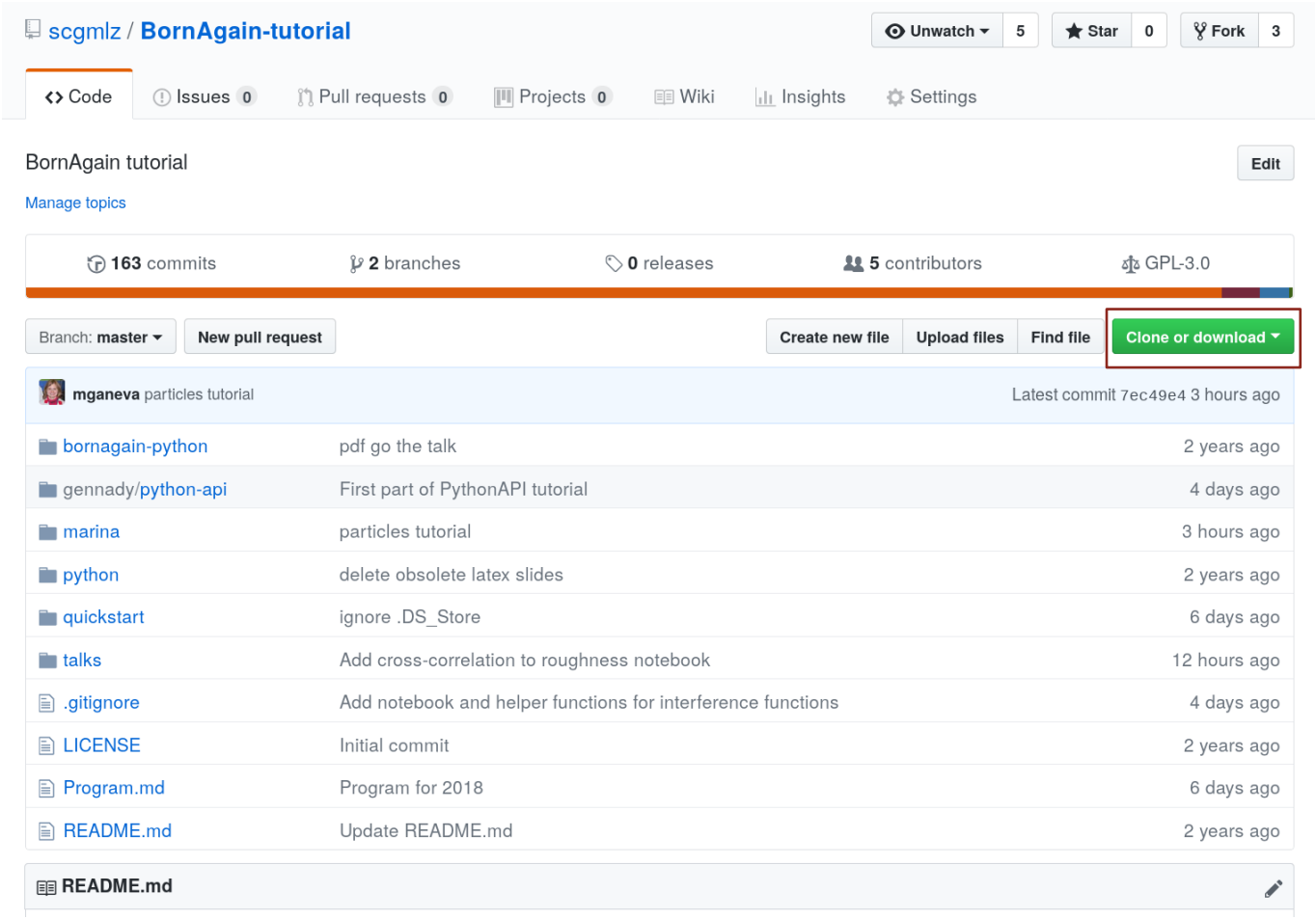

School materials

Materials related to given topic are located in corresponding sub folder, for example

School program

```
BornAgain-tutorials/talks/day_1/plan_of_the_school_G
    school_plan.pdf
```

GISAS theory

```
BornAgain-tutorials/talks/day_1/gisas_theory_W
    GISAS_theory.ipynb
```

GUI basics III

```
BornAgain-tutorials/talks/day_1/gui_basics_3_G
    gui_basics_3.pdf
    SpheresAtHexLattice
```

BornAgain in a web browser

https://bornagain.its.kfa-juelich.de

20 virtual machines, Ubuntu 18.04, Python 3.6.7, BornAgain 1.14

```
Username: bornagain01 – bornagain40
Password: BornAgain.01 – BornAgain.40
```