

FairSHiP

Software for SHiP



OUTLINE for today

- **Introduction:** Thomas Ruf
- **FairSHiP tutorial:** Elena Graverini
- **TGeo / Geant4 geometry:** Annarita Buonauro

OUTLINE for tomorrow

- **Production and analysis on SkyGrid:** Alexander Baranov (Sasha)

FairSHiP

Software for SHiP



Thomas Ruf (CERN)

- **Basics**
- **Software Overview**
- **Structure**

■ Mailing list

- ◆ ship-software@cern.ch (SHIP Collaboration mailing list dedicated to software)
- ◆ Archive: <https://groups.cern.ch/group/ship-software/default.aspx>

■ Web page

- ◆ <http://ship.web.cern.ch/ship/FairShip/default.html>

■ Instructions for working at CERN

- ◆ <http://ship.web.cern.ch/ship/FairShip/computingAtCERN.html>

■ Software repositories

- ◆ <https://github.com/ShipSoft>
 - ▶ <https://github.com/ShipSoft/FairSoft>
 - ▶ <https://github.com/ShipSoft/FairRoot>
 - ▶ <https://github.com/ShipSoft/FairShip>

- ◆ Installation on afs:

- ▶ [/afs/cern.ch/sw/ShipSoft](afs.cern.ch/sw/ShipSoft)

■ Data repository

- ◆ EOS: [/eos/ship/data](#), quota 10TB

- ◆ Documentation:

<https://trufship@git.cern.ch/repos/shipdocs/>

or

<https://git.cern.ch/web/shipdocs.git/tree/HEAD:/Public/FairShip>

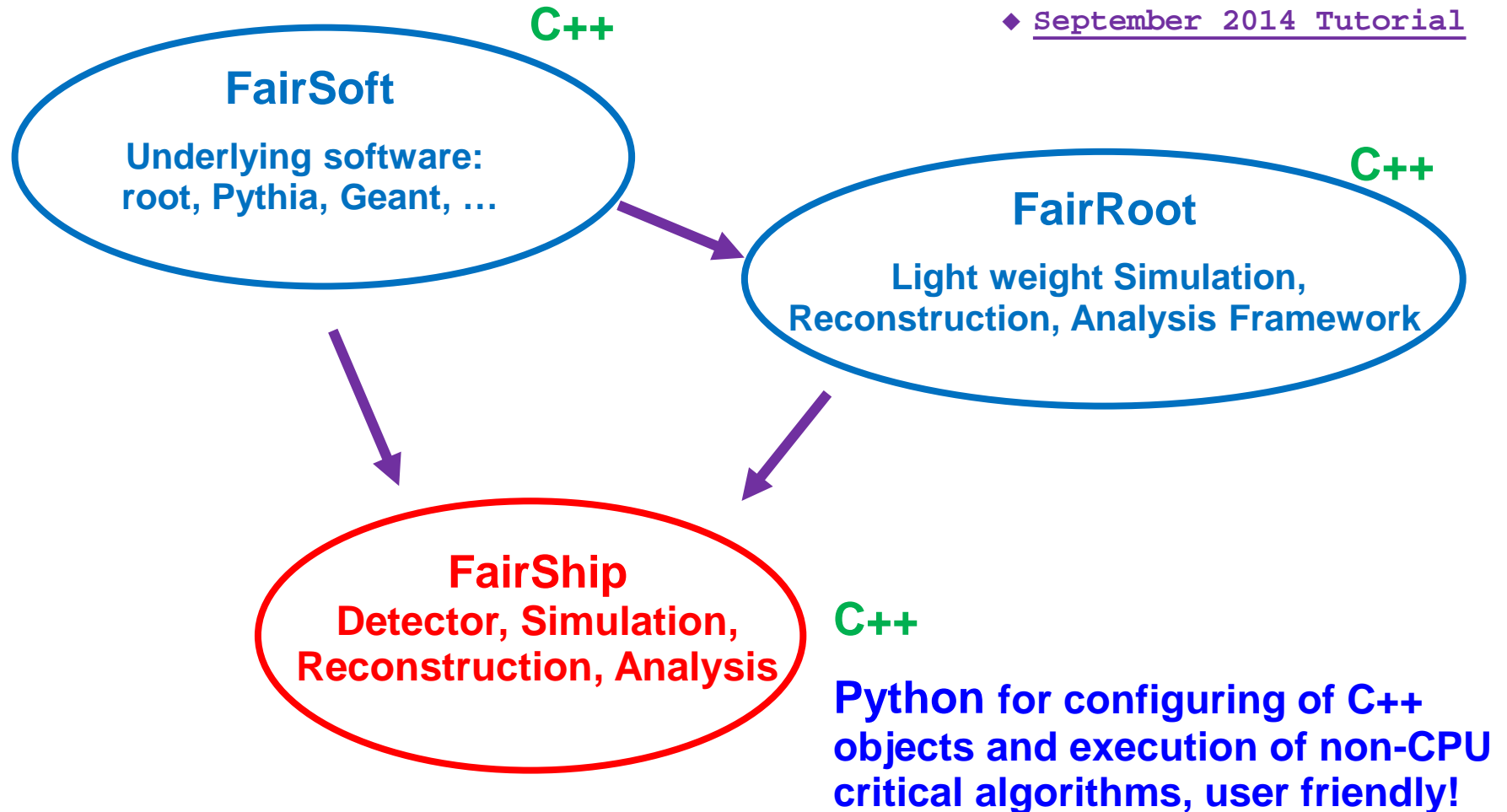


Software Overview

■ 3 Layers

◆ <https://fairroot.gsi.de/>

◆ [September 2014 Tutorial](#)



■ GIT

- ◆ **Widely used distributed version control system**
- ◆ **Every Git working directory is a full-fledged repository with complete history and full version-tracking capabilities**
- ◆ **Central hub:** <https://github.com/ShipSoft>
- ◆ **Main commands:**
 - ▶ `git clone https://github.com/ShipSoft/FairShip.git` : create local copy of FairShip
- ◆ **In FairShip directory**
 - ▶ `git pull` : fetch all updates from central hub
 - ▶ `git checkout c71af77179224b6d0f7393c69ab257df8b50722c` : specific version
 - ▶ If you want to know more: <https://github.com/ShipSoft/FairShip/wiki/Git-Tutorial-for-SHIP>

■ Software development

- ◆ **For the moment, one person (me) doing commits and push**
- ◆ **If you have any changes, additions, etc., please present it in the shipsoft meeting and send me the code.**

git checkout

GitHub This repository Search Explore Features Enterprise Pricing

ShipSoft / FairShip Watch 7 Star

SHIP experiment framework based on FairRoot <http://shp.web.cern.ch/ship/>

449 commits 1 branch 1 release 5 contributors

Branch: master FairShip +

add support for reading charm hadrons from external file, take rando... ThomasRuf authored 10 minutes ago latest commit

- diag VM diagnostics update
- ecal access links from Ecalclusters to MC particles from python, example i...
- field cut off B field of SHiP spectrometer magnet transversely, run_simScri...
- gconfig stop at least some of the geant4 useless output
- genfit correct 2nd method, get(const TVector3& pos), to call BellField::get(...
- geometry changes to nutau detector geometry, addition of NuageGenerator, code ...
- hcal elliptic envelope for Ecal and Hcal, enables less detailed view of ca...

Commits on Sep 30, 2015

- add support for reading charm hadrons from external file, take rando... ThomasRuf authored 11 minutes ago 5a9f99b
- charmed hadron production, primary and cascade, to be used as input f... ThomasRuf authored an hour ago 492893f
- fixed matching to MC truth also for HNL decays with intermediate stat... ThomasRuf authored 2 hours ago ccea77d

Commits on Sep 24, 2015

- add possibility to read charm/beauty externally produced ThomasRuf authored 6 days ago 143865f

Merge branch 'master' of https://github.com/ShipSoft/FairShip Browse files

ThomasRuf authored 7 days ago

commit 168d71dd312407Fbd96d8fe675b6799Fde01d946
2 parents 4be6caf + ac3ff04

Showing 3 changed files with 4 additions and 3 deletions. Unified Split

2 vm/_common.sh View

```

... 1 SCRIPT_NAME=$0
2 -[ -z "$SCRIPT_NAME" ] && SCRIPT_NAME=$BASH_SOURCE
+[[ -z "$SCRIPT_NAME" || "$SCRIPT_NAME" == "bash" ]] && SCRIPT_NAME=$BASH_SOURCE
3 VM_DIR=`dirname "$SCRIPT_NAME"`
4 source $VM_DIR/_functions.sh
5

```

■ Geometry

- ◆ **Subdetector directories and passive materials**
 - ▶ /nutaudet, /veto, /strawtubes, /ecal, /hcal, /muon, /passive
- ◆ **Also contain**
 - ▶ Definition which volumes are sensitive
 - ▶ What information to store for MC particles entering the volume, momentum, entry/exit points

■ Global data objects

- ◆ **shipdata directory**
 - ▶ shipstack, work space for Geant
 - ▶ ShipMCTrack, MC particle object of FairShip

■ MC Generators

- ◆ **shipgen directory**
- ◆ **Implemented use cases:**
 - ▶ HNL signal from charm (beauty): HNLPythia8Generator
 - ▶ Muon background: MuonBackGenerator
 - ▶ Muon inelastic interactions: MuDISGenerator
 - ▶ Neutrino inelastic interactions: GenieGenerator, NuageGenerator
 - ▶ Cosmic background: CosmicsGenerator

■ Configuration

◆ python directory

- ▶ shipDet_conf.py, DecaySelection.conf
- ▶ Also some other useful modules: shipunits.py, ShipStyle.py

◆ geometry directory

- ▶ Geometry parameters for ecal and hcal
- ▶ List of materials, media.geo

■ Execution

◆ macro directory

◆ Scripts to run simulation, reconstruction, analysis and eventdisplay

◆ Accept command line arguments for different use cases

- ▶ run_simScript.py simulation
 Philosophy: one script for many use cases, instead of many scripts each for one use case.

- ▶ ShipReco.py reconstruction
- ▶ ShipAna.py template for analysis
- ▶ eventdisplay.py visualization of detector geometry and event data

◆ genfit directory

- ▶ External package for track fitting, extrapolation of track states through magnetic field and material
- ▶ Tutorial by Sebastian Neubert, <https://indico.cern.ch/event/336469/session/0/contribution/5/attachments/658106/904773/genfitintro.pdf>

Not covered today

- **FairSoft/FairRoot/FairShip can easily be installed on your laptop/desktop**
 - ◆ With linux operating system
 - ◆ Or using a Virtual Machine
<https://github.com/ShipSoft/FairShip/wiki/Linux:-Building-&-Running-FairShip-using-Virtual-Machine-container>
 - ◆ Local installation is preferred solution for running event display