

Geant4 examples and guides

VI International Geant4 School
26-30 November 2018, Trento (Italy)

Carlo Mancini Terracciano
carlo.mancini.terracciano@roma1.infn.it



The Geant4 website



The screenshot shows the Geant4 website homepage. At the top, there is a navigation bar with the Geant4 logo and the text "A SIMULATION TOOLKIT". To the right of the logo are links for "Download", "User Forum", "Contact Us", and "Gallery". Below the navigation bar is a "Collaborator Login" link. The main content area is titled "Overview" and contains a paragraph describing Geant4 as a toolkit for simulating particle passage through matter. Below this paragraph is a grid of four categories: "Applications", "User Support", "Publications", and "Collaboration", each with a representative image and a brief description. To the right of the main content is a "News" section with a list of recent updates. At the bottom of the page is an "Events" section listing upcoming workshops and schools.

Overview

Geant4 is a toolkit for the simulation of the passage of particles through matter. Its areas of application include high energy, nuclear and accelerator physics, as well as studies in medical and space science. The three main reference papers for Geant4 are published in Nuclear Instruments and Methods in Physics Research **A 606** (2003) 260-303 [#P](#), IEEE Transactions on Nuclear Science **53** No. 1 (2006) 270-278 [#P](#) and Nuclear Instruments and Methods in Physics Research **A 635** (2018) 186-225 [#P](#).

Applications
A sampling of applications, technology transfer and other uses of Geant4
[print-friendly version](#)

User Support
Getting started, guides and information for users and developers

Publications
Validation of Geant4, results from experiments and publications

Collaboration
Who we are: collaborating institutions, members, organization and legal information

News

- 29 Jun 2018
Release 10.5-BETA is available from the [BETA Download](#) area.
- 25 May 2018
Patch-02 to release 10.4 is available from the [Download](#) area.
- 12 Mar 2018
2018 planned developments
- 20 Oct 2017
Patch-03 to release 10.3 is available from the [source archive](#) area.

Events

- 13th Geant4 Space Users Workshop [#P](#) at the Space Center Houston, Texas (USA), 28-30 November 2018.
- 6th International Geant4 School [#P](#), Trento (Italy), 26-30 November 2018.
- ENSAR2 workshop: Geant4 in nuclear physics [#P](#), at CIEMAT, Madrid (Spain), 24-26 April 2018.

[Past Events](#)

The Geant4 website

- www.geant4.org



The screenshot shows the Geant4 website homepage. At the top, there is a navigation bar with the Geant4 logo and the text "A SIMULATION TOOLKIT". To the right of the logo are links for "Download", "User Forum", "Contact Us", and "Gallery". Below the navigation bar is a "Collaborator Login" link. The main content area is titled "Overview" and contains a paragraph describing Geant4 as a toolkit for simulating particle passage through matter. Below this paragraph is a grid of four sections: "Applications" (with an image of a particle detector), "User Support" (with an image of a globe), "Publications" (with an image of a particle detector), and "Collaboration" (with an image of a group of people). To the right of the main content is a "News" section with a list of recent updates, including the release of Geant4 10.5-BETA and Patch-02 to release 10.4. At the bottom of the page is an "Events" section with a list of upcoming workshops and schools.

Overview

Geant4 is a toolkit for the simulation of the passage of particles through matter. Its areas of application include high energy, nuclear and accelerator physics, as well as studies in medical and space science. The three main reference papers for Geant4 are published in Nuclear Instruments and Methods in Physics Research **A 606** (2003) 260-303 <#>, IEEE Transactions on Nuclear Science **53** No. 1 (2006) 270-278 <#> and Nuclear Instruments and Methods in Physics Research **A 635** (2018) 186-225 <#>.

Applications
A sampling of applications, technology transfer and other uses of Geant4
[print-friendly version](#)

User Support
Getting started, guides and information for users and developers

Publications
Validation of Geant4, results from experiments and publications

Collaboration
Who we are: collaborating institutions, members, organization and legal information

News

- 29 Jun 2018
Release 10.5-BETA is available from the [BETA Download](#) area.
- 25 May 2018
Patch-02 to release 10.4 is available from the [Download](#) area.
- 12 Mar 2018
[2018 planned developments](#)
- 20 Oct 2017
Patch-03 to release 10.3 is available from the [source archive](#) area.

Events


- 13th Geant4 Space Users Workshop <#> at the Space Center Houston, Texas (USA), 28-30 November 2018.
- 6th International Geant4 School <#>, Trento (Italy), 26-30 November 2018.
- ENSAR2 workshop: Geant4 in nuclear physics <#>, at CIEMAT, Madrid (Spain), 24-26 April 2018.

[Past Events](#)

The Geant4 website

- www.geant4.org


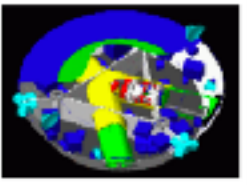

- Future and past events (e.g.: this course)



The screenshot shows the Geant4 website homepage. At the top, there is a navigation bar with the Geant4 logo and the text "A SIMULATION TOOLKIT". To the right of the logo are links for "Download", "User Forum", "Contact Us", and "Gallery". Below the navigation bar is a "Collaborator Login" link. The main content area is titled "Overview" and contains a paragraph describing Geant4 as a toolkit for simulating particle passage through matter. Below this paragraph are four columns of content: "Applications" (with an image of a particle detector), "User Support" (with an image of a globe), "Publications" (with an image of a particle detector), and "Collaboration" (with an image of a group of people). At the bottom of the page, there is an "Events" section listing several workshops and schools, and a "Past Events" section.

Overview

Geant4 is a toolkit for the simulation of the passage of particles through matter. Its areas of application include high energy, nuclear and accelerator physics, as well as studies in medical and space science. The three main reference papers for Geant4 are published in Nuclear Instruments and Methods in Physics Research A 606 (2003) 260-303 <#>, IEEE Transactions on Nuclear Science 53 No. 1 (2006) 270-278 <#> and Nuclear Instruments and Methods in Physics Research <#>A 635 (2018) 186-225 <#>.

Applications	User Support	Publications	Collaboration
			
A sampling of applications, technology transfer and other uses of Geant4	Getting started, guides and information for users and developers	Validation of Geant4, results from experiments and publications	Who we are: collaborating institutions, members, organization and legal information

Events

- 13th Geant4 Space Users Workshop <#> at the Space Center Houston, Texas (USA), 28-30 November 2018.
- 6th International Geant4 School <#>, Trento (Italy), 26-30 November 2018.
- ENSAR2 workshop: Geant4 in nuclear physics <#>, at CIEMAT, Madrid (Spain), 24-26 April 2018.

Past Events

News

- 29 Jun 2018 Release 10.5-BETA is available from the BETA [Download](#) <#> area.
- 25 May 2018 Patch-02 to release 10.4 is available from the [Download](#) area.
- 12 Mar 2018 2018 planned developments
- 20 Oct 2017 Patch-03 to release 10.3 is available from the [source archive](#) area.

The Geant4 website

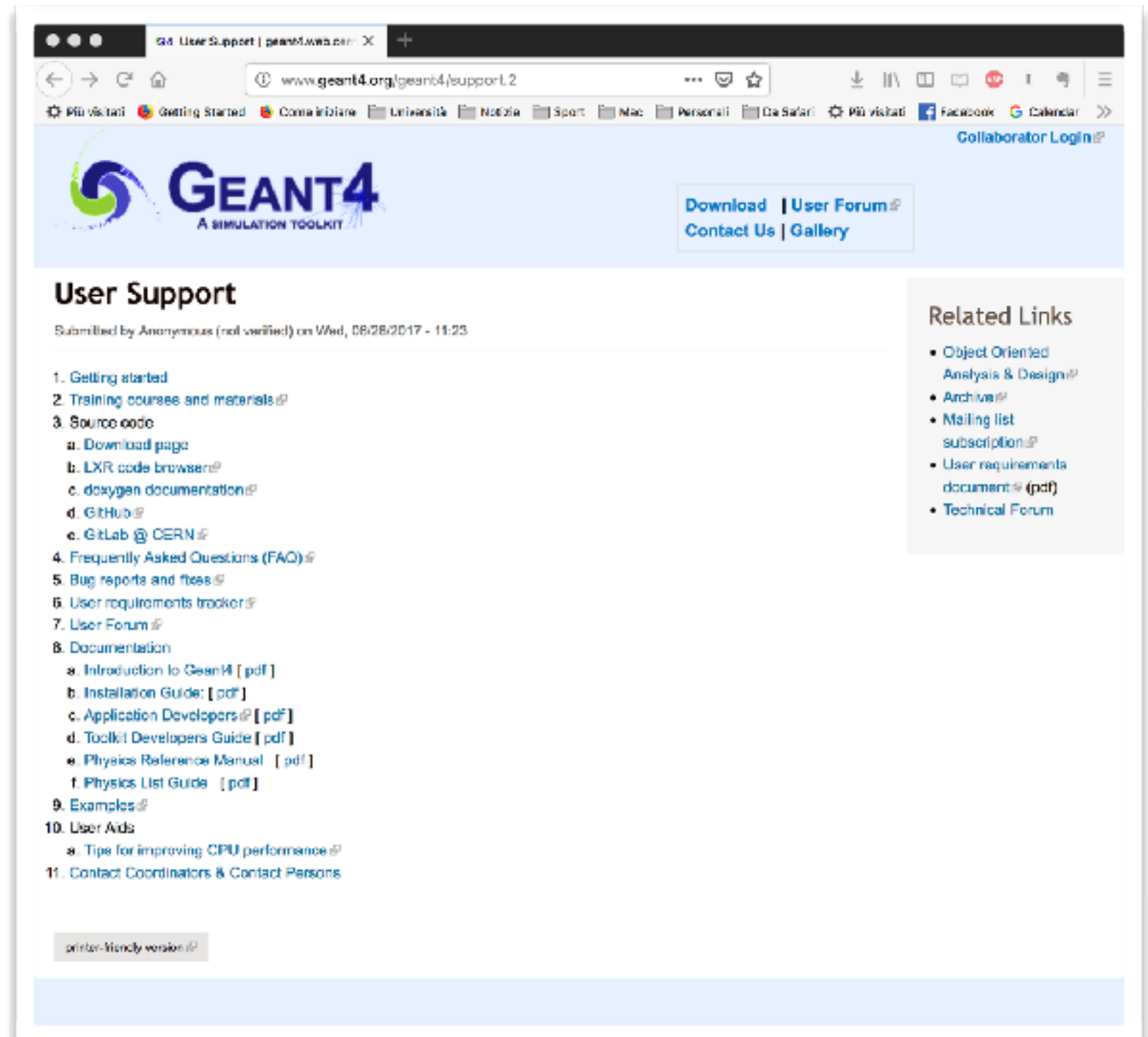
- www.geant4.org
- Future and past events (e.g.: this course)
- User support (one of the best friends for Geant4 users...)



The screenshot shows the Geant4 website homepage. At the top, there is a navigation bar with the Geant4 logo and a 'Collaborator Login' link. Below the logo, there are links for 'Download', 'User Forum', 'Contact Us', and 'Gallery'. The main content area is titled 'Overview' and contains a paragraph describing Geant4 as a simulation toolkit for particle passage through matter. Below this, there are four columns: 'Applications' (with an image of a particle detector), 'User Support' (with an image of a globe), 'Publications' (with an image of a detector component), and 'Collaboration' (with an image of a group of people). To the right of the main content is a 'News' section with several entries, including 'Release 10.5-BETA is available from the BETA Download area' and 'Patch-02 to release 10.4 is available from the Download area'. At the bottom, there is an 'Events' section listing upcoming workshops and schools, and a 'Past Events' section.

The Geant4 website

- [www.geant4.org/
geant4/support.2](http://www.geant4.org/geant4/support.2)



The screenshot shows a web browser window displaying the Geant4 User Support page. The browser's address bar shows the URL www.geant4.org/geant4/support.2. The page features the Geant4 logo, which consists of a stylized green and blue swirl followed by the text "GEANT4 A SIMULATION TOOLKIT". To the right of the logo is a navigation menu with links for "Download", "User Forum", "Contact Us", and "Gallery". Below the logo, the page title is "User Support", and a submission notice reads "Submitted by Anonymous (not verified) on Wed, 06/26/2017 - 11:23". The main content area contains a numbered list of 11 items, including "Getting started", "Training courses and materials", "Source code" (with sub-items like "Download page", "LXR code browser", "doxygen documentation", "GitHub", and "GitLab @ CERN"), "Frequently Asked Questions (FAQ)", "Bug reports and fixes", "User requirements tracker", "User Forum", "Documentation" (with sub-items like "Introduction to Geant4", "Installation Guide", "Application Developers", "Toolkit Developers Guide", "Physics Reference Manual", and "Physics List Guide"), "Examples", "User Aids" (with sub-item "Tips for improving CPU performance"), and "Contact Coordinators & Contact Persons". A "printer-friendly version" link is located at the bottom of the list. On the right side of the page, there is a "Related Links" section with a list of links: "Object Oriented Analysis & Design", "Archive", "Mailing list subscription", "User requirements document (pdf)", and "Technical Forum".

The Geant4 website

- [www.geant4.org/
geant4/support.2](http://www.geant4.org/geant4/support.2)
- Documentation



The screenshot shows a web browser window displaying the Geant4 User Support page. The browser's address bar shows the URL www.geant4.org/geant4/support.2. The page features the Geant4 logo and navigation links for Download, User Forum, Contact Us, and Gallery. The main content area is titled "User Support" and lists various resources. A blue box highlights the "Documentation" section, which includes links to PDF guides for Introduction to Geant4, Installation, Application Developers, Toolkit Developers, Physics Reference Manual, and Physics List Guide. A "Related Links" sidebar on the right lists additional resources like Object Oriented Analysis & Design, Archive, Mailing list subscription, User requirements document (pdf), and Technical Forum.

User Support
Submitted by Anonymous (not verified) on Wed, 06/26/2017 - 11:23

1. Getting started
2. Training courses and materials
3. Source code
 - a. Download page
 - b. LXR code browser
 - c. doxygen documentation
 - d. GitHub
 - e. GitLab @ CERN
4. Frequently Asked Questions (FAQ)
5. Bug reports and fixes
6. User requirements tracker
7. User Forum
8. Documentation
 - a. Introduction to Geant4 [pdf]
 - b. Installation Guide [pdf]
 - c. Application Developers [pdf]
 - d. Toolkit Developers Guide [pdf]
 - e. Physics Reference Manual [pdf]
 - f. Physics List Guide [pdf]
9. Examples
10. User Wiki
 - a. Tips for improving CPU performance
11. Contact Coordinators & Contact Persons

[printer-friendly version](#)

Related Links

- [Object Oriented Analysis & Design](#)
- [Archive](#)
- [Mailing list subscription](#)
- [User requirements document \(pdf\)](#)
- [Technical Forum](#)

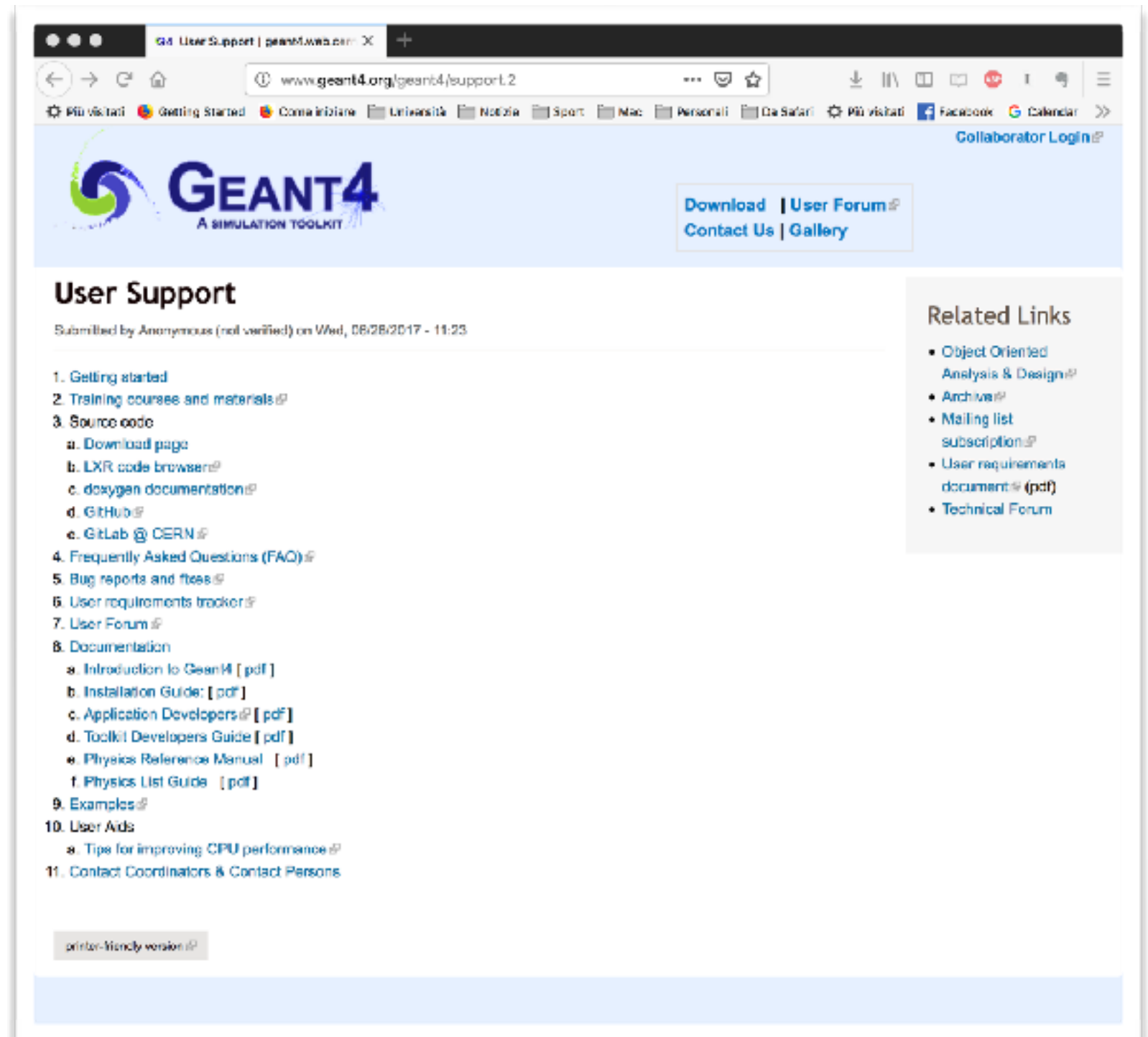
The Geant4 website

- www.geant4.org/geant4/support.2
- Documentation
- Application Developers (you!) guide

The screenshot shows a web browser window displaying the Geant4 website's 'User Support' page. The browser's address bar shows the URL 'www.geant4.org/geant4/support.2'. The page header includes the Geant4 logo and navigation links: 'Download', 'User Forum', 'Contact Us', and 'Gallery'. The main content area is titled 'User Support' and lists various support topics. The 'Documentation' section is expanded, showing a list of documents. The document 'Application Developers [pdf]' is highlighted with an orange box, and a hand-drawn orange arrow points from this box to the text 'Application Developers (you!) guide' in the list on the left. Other documents listed include 'Introduction to Geant4 [pdf]', 'Installation Guide [pdf]', 'Physics Reference Manual [pdf]', and 'Physics List Guide [pdf]'. A 'Related Links' sidebar on the right contains links to 'Object Oriented Analysis & Design', 'Archive', 'Mailing list subscription', 'User requirements document (pdf)', and 'Technical Forum'. A 'printer-friendly version' link is visible at the bottom of the page.

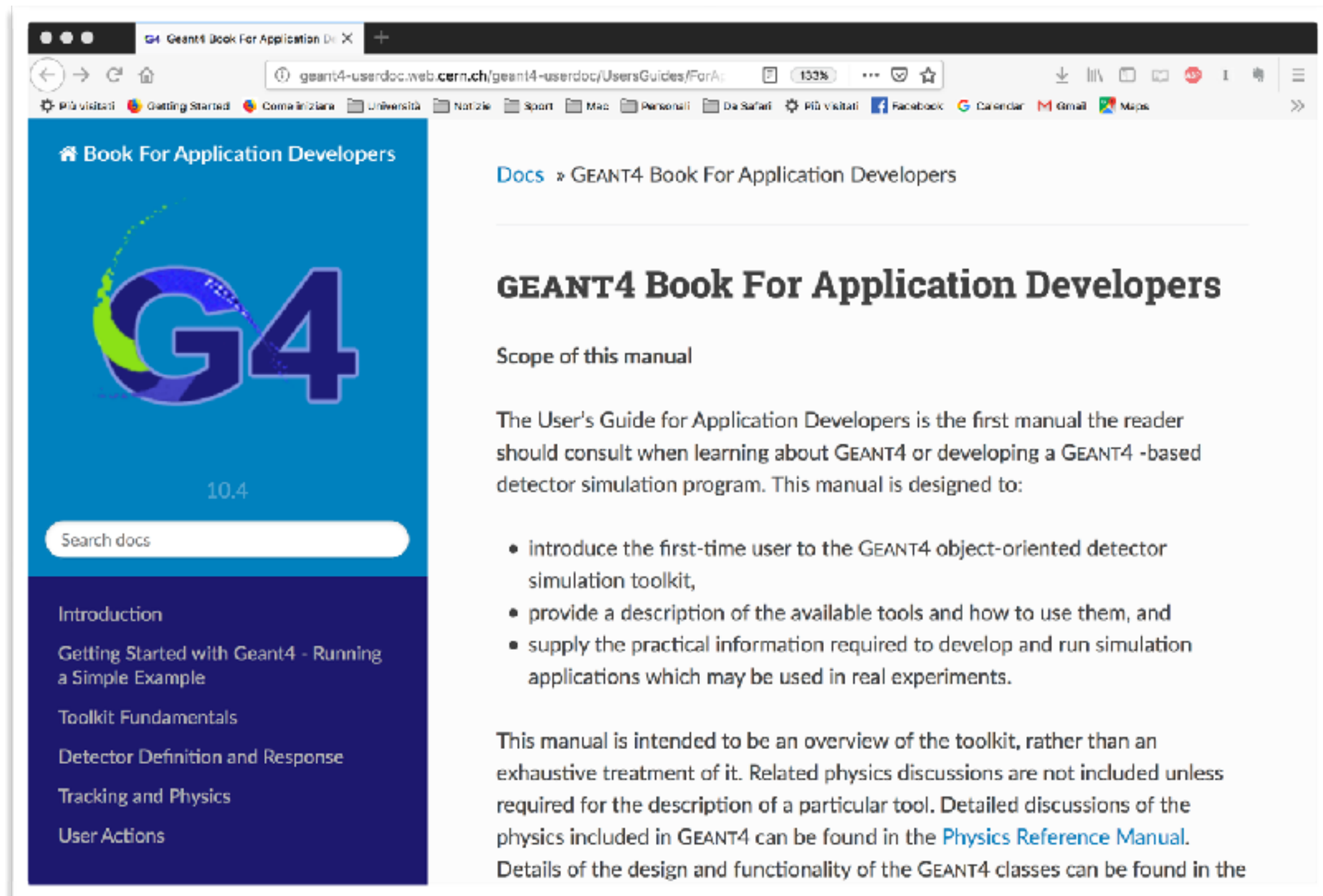
The Geant4 website

- www.geant4.org/geant4/support.2
- Documentation
- Application Developers (you!) guide



The screenshot shows a web browser window displaying the Geant4 User Support page. The browser's address bar shows the URL www.geant4.org/geant4/support.2. The page header features the Geant4 logo and navigation links: Download, User Forum, Contact Us, and Gallery. The main content area is titled "User Support" and includes a submission notice: "Submitted by Anonymous (not verified) on Wed, 06/26/2017 - 11:23". Below this, a list of 11 items is provided, including "Getting started", "Training courses and materials", "Source code" (with sub-items like "Download page", "LXR code browser", "doxygen documentation", "GitHub", and "GitLab @ CERN"), "Frequently Asked Questions (FAQ)", "Bug reports and fixes", "User requirements tracker", "User Forum", "Documentation" (with sub-items like "Introduction to Geant4", "Installation Guide", "Application Developers", "Toolkit Developers Guide", "Physics Reference Manual", and "Physics List Guide"), "Examples", "User Aids" (with sub-item "Tips for improving CPU performance"), and "Contact Coordinators & Contact Persons". A "printer-friendly version" link is located at the bottom of the list. On the right side, a "Related Links" section lists: "Object Oriented Analysis & Design", "Archive", "Mailing list subscription", "User requirements document (pdf)", and "Technical Forum".

Application Developers user guide



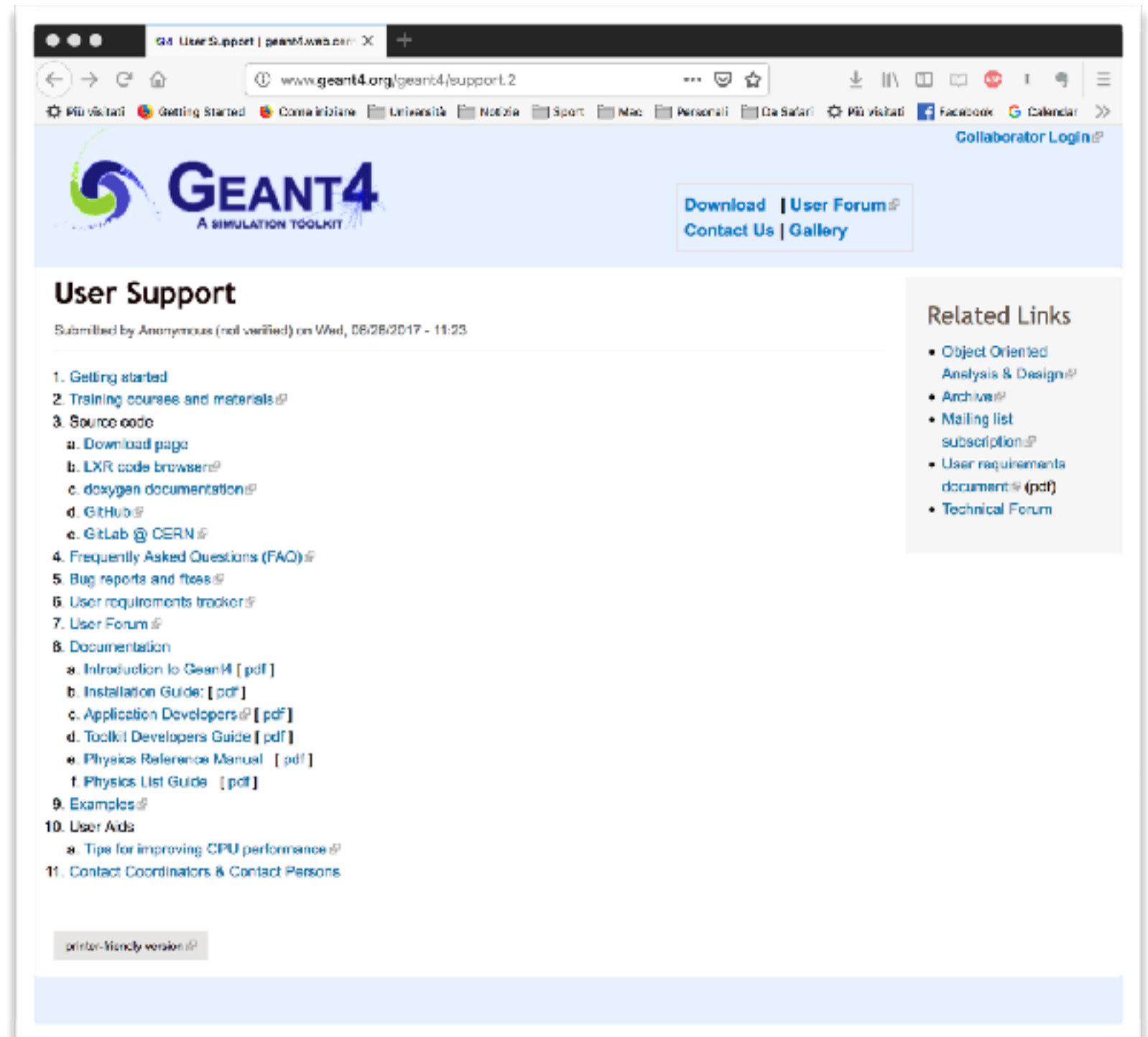
The screenshot shows a web browser window displaying the GEANT4 Book For Application Developers user guide. The browser's address bar shows the URL: `geant4-userdoc.web.cern.ch/geant4-userdoc/UsersGuides/ForA...`. The page features a blue header with the GEANT4 logo and the text "Book For Application Developers". Below the header, there is a search bar labeled "Search docs" and a list of navigation links: "Introduction", "Getting Started with Geant4 - Running a Simple Example", "Toolkit Fundamentals", "Detector Definition and Response", "Tracking and Physics", and "User Actions". The main content area is titled "GEANT4 Book For Application Developers" and includes a section "Scope of this manual" which states: "The User's Guide for Application Developers is the first manual the reader should consult when learning about GEANT4 or developing a GEANT4 -based detector simulation program. This manual is designed to:" followed by a bulleted list of objectives. The list includes: "introduce the first-time user to the GEANT4 object-oriented detector simulation toolkit," "provide a description of the available tools and how to use them, and" and "supply the practical information required to develop and run simulation applications which may be used in real experiments." Below the list, a paragraph states: "This manual is intended to be an overview of the toolkit, rather than an exhaustive treatment of it. Related physics discussions are not included unless required for the description of a particular tool. Detailed discussions of the physics included in GEANT4 can be found in the [Physics Reference Manual](#). Details of the design and functionality of the GEANT4 classes can be found in the

Application Developers user guide

- <http://geant4-userdoc.web.cern.ch/geant4-userdoc/UsersGuides/ForApplicationDeveloper/html/index.html>
- Introduces new Users to the Geant4 toolkit
- Describes the most useful tools
- Describes how to set-up and run a simulation application
- Intended as an overview of the toolkit, not an exhaustive treatment

The Geant4 website

- www.geant4.org
- Documentation
- Application Developers (you!) guide



The screenshot shows a web browser window displaying the Geant4 User Support page. The browser's address bar shows the URL www.geant4.org/geant4/support.2. The page header features the Geant4 logo and navigation links: [Download](#), [User Forum](#), [Contact Us](#), and [Gallery](#). The main content area is titled "User Support" and includes a submission notice: "Submitted by Anonymous (not verified) on Wed, 06/26/2017 - 11:23". Below this, a list of 11 numbered items provides a structured overview of the support resources:

1. Getting started
2. Training courses and materials
3. Source code
 - a. Download page
 - b. LXR code browser
 - c. doxygen documentation
 - d. GitHub
 - e. GitLab @ CERN
4. Frequently Asked Questions (FAQ)
5. Bug reports and fixes
6. User requirements tracker
7. User Forum
8. Documentation
 - a. Introduction to Geant4 [pdf]
 - b. Installation Guide [pdf]
 - c. Application Developers [pdf]
 - d. Toolkit Developers Guide [pdf]
 - e. Physics Reference Manual [pdf]
 - f. Physics List Guide [pdf]
9. Examples
10. User Aids
 - a. Tips for improving CPU performance
11. Contact Coordinators & Contact Persons

At the bottom of the list, there is a link for a [printer-friendly version](#). On the right side of the page, a "Related Links" sidebar contains several additional resources:

- [Object Oriented Analysis & Design](#)
- [Archive](#)
- [Mailing list subscription](#)
- [User requirements document \(pdf\)](#)
- [Technical Forum](#)

The Geant4 website

- www.geant4.org
- Documentation
- Application Developers (you!) guide
- Physics Reference Manual

The screenshot shows the 'User Support' page on the Geant4 website. The browser address bar indicates the URL is www.geant4.org/geant4/support.2. The page header includes the Geant4 logo and navigation links: 'Download', 'User Forum', 'Contact Us', and 'Gallery'. The main content area is titled 'User Support' and shows a submission by an anonymous user on Wed, 06/26/2017 - 11:23. A list of support topics is provided, with 'Physics Reference Manual [pdf]' highlighted by an orange arrow. The 'Related Links' sidebar on the right includes links to 'Object Oriented Analysis & Design', 'Archive', 'Mailing list subscription', 'User requirements document (pdf)', and 'Technical Forum'. A 'printer-friendly version' link is located at the bottom of the page.

User Support
Submitted by Anonymous (not verified) on Wed, 06/26/2017 - 11:23

1. Getting started
2. Training courses and materials
3. Source code
 - a. Download page
 - b. LXR code browser
 - c. doxygen documentation
 - d. GitHub
 - e. GitLab @ CERN
4. Frequently Asked Questions (FAQ)
5. Bug reports and fixes
6. User requirements tracker
7. User Forum
8. Documentation
 - a. Introduction to Geant4 [pdf]
 - b. Installation Guide [pdf]
 - c. Application Developers [pdf]
 - d. Toolkit Developers Guide [pdf]
 - e. **Physics Reference Manual [pdf]**
 - f. Physics List Users [pdf]
9. Examples
10. User Aids
 - a. Tips for improving CPU performance
11. Contact Coordinators & Contact Persons

[printer-friendly version](#)

Related Links

- [Object Oriented Analysis & Design](#)
- [Archive](#)
- [Mailing list subscription](#)
- [User requirements document \(pdf\)](#)
- [Technical Forum](#)

Physics Reference Manual

Physics Reference Manual

10.4

Search docs

General Information

Particle Decay

Electromagnetic Interactions

Solid State Physics

Hadronic Physics in GEANT4

Gamma- and Lepto-Nuclear Interactions

Docs > Physics Reference Manual

Physics Reference Manual

Scope of this Manual

The Physics Reference Manual provides detailed explanations of the physics implemented in the GEANT4 toolkit.

The manual's purpose is threefold:

- to present the theoretical formulation, model, or parameterization of the physics interactions included in GEANT4,
- to describe the probability of the occurrence of an interaction and the sampling mechanisms required to simulate it, and
- to serve as a reference for toolkit users and developers who wish to consult the underlying physics of an interaction.

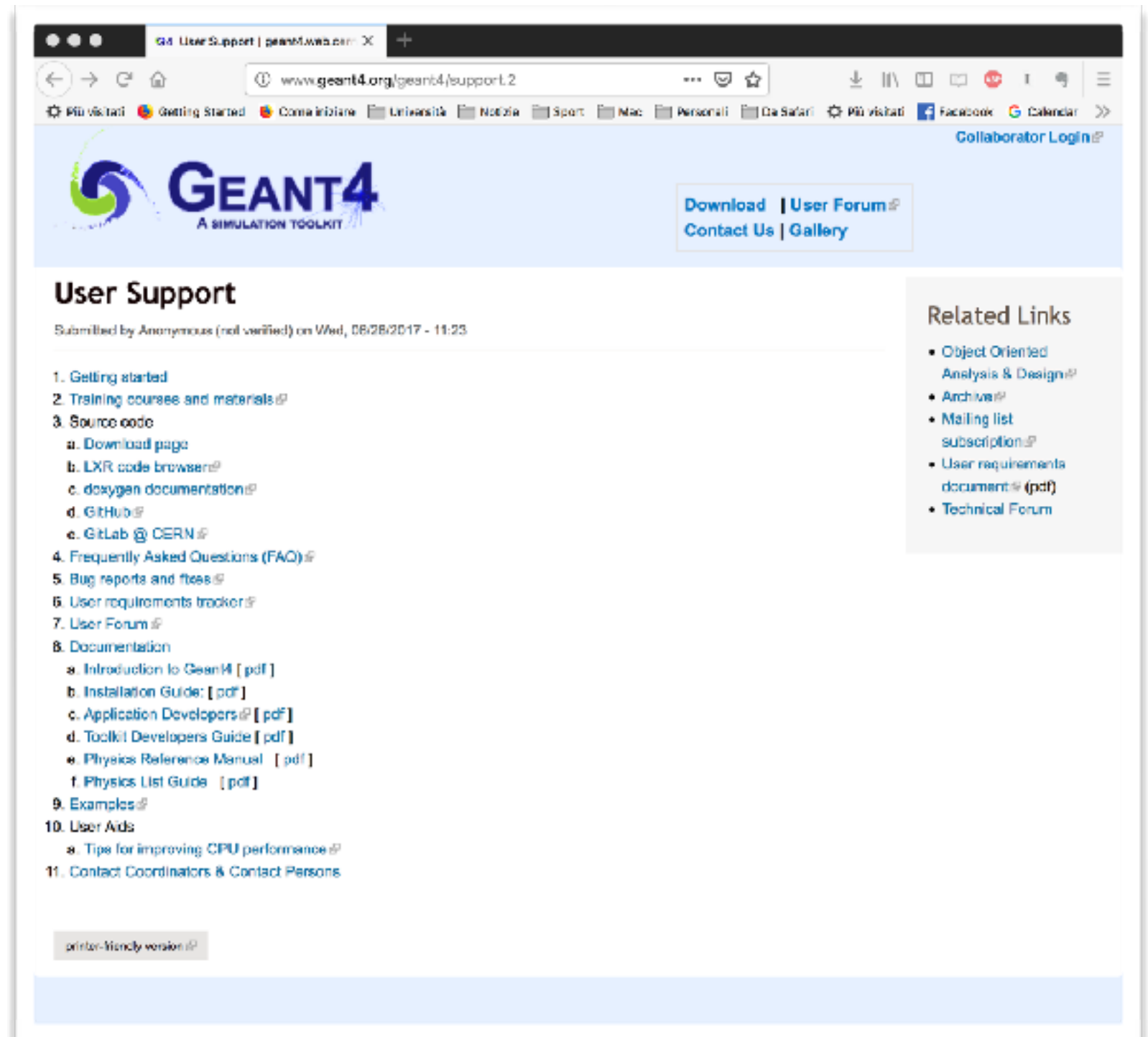
This manual does not discuss code implementation or how to use the implemented physics interactions in a simulation. These topics are discussed in the *User's Guide for Application Developers*. Details of the object-oriented

Physics Reference Manual

- <http://geant4-userdoc.web.cern.ch/geant4-userdoc/UsersGuides/PhysicsReferenceManual/html/index.html>
- A reference for toolkit Users and developers who wish to consult and study the physics of an interaction/model
- Present the theoretical formulation, model or parameterisation of the physics interactions provided by Geant4

The Geant4 website

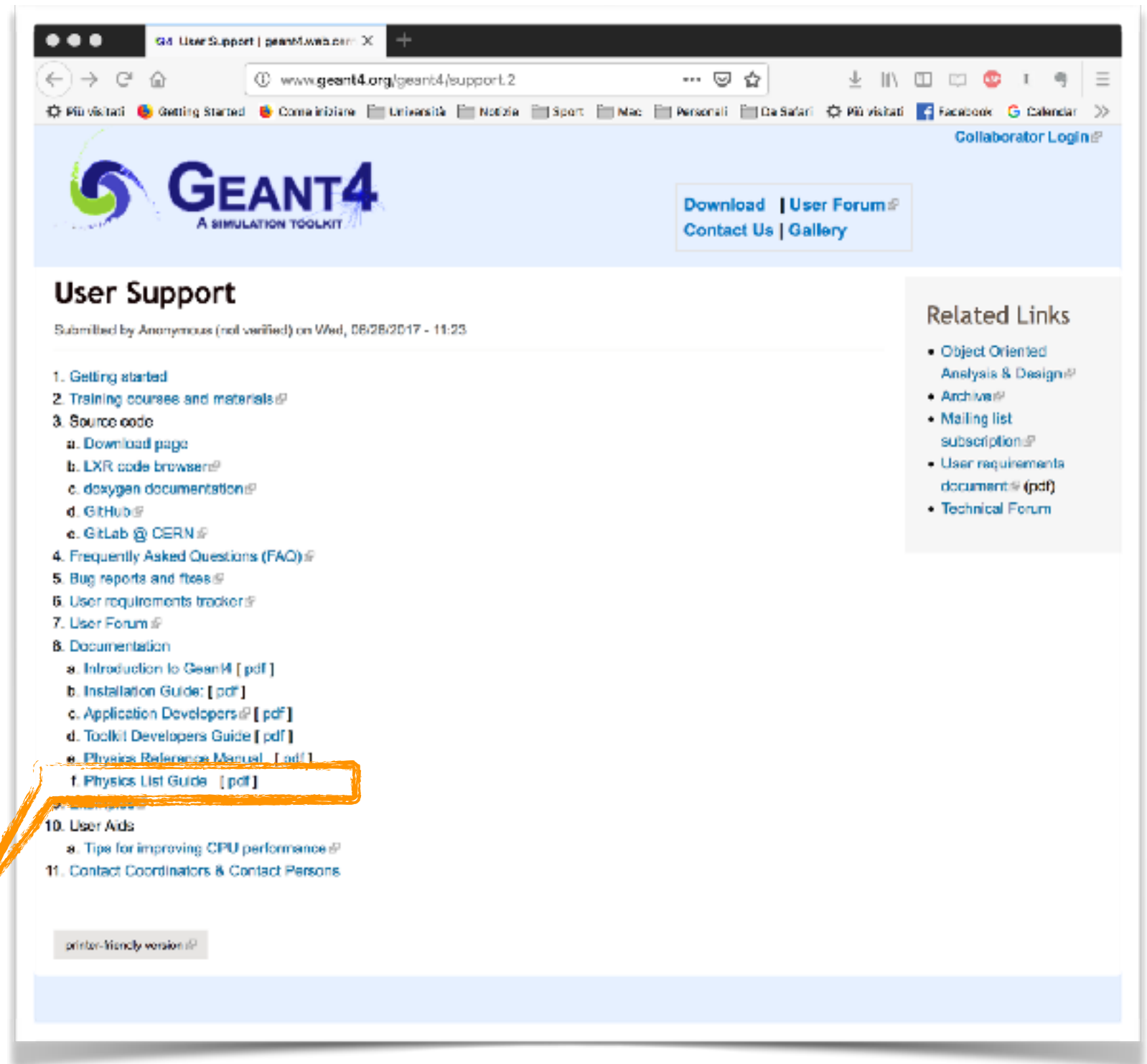
- www.geant4.org
- Documentation
- Application Developers (you!) guide
- Physics Reference Manual



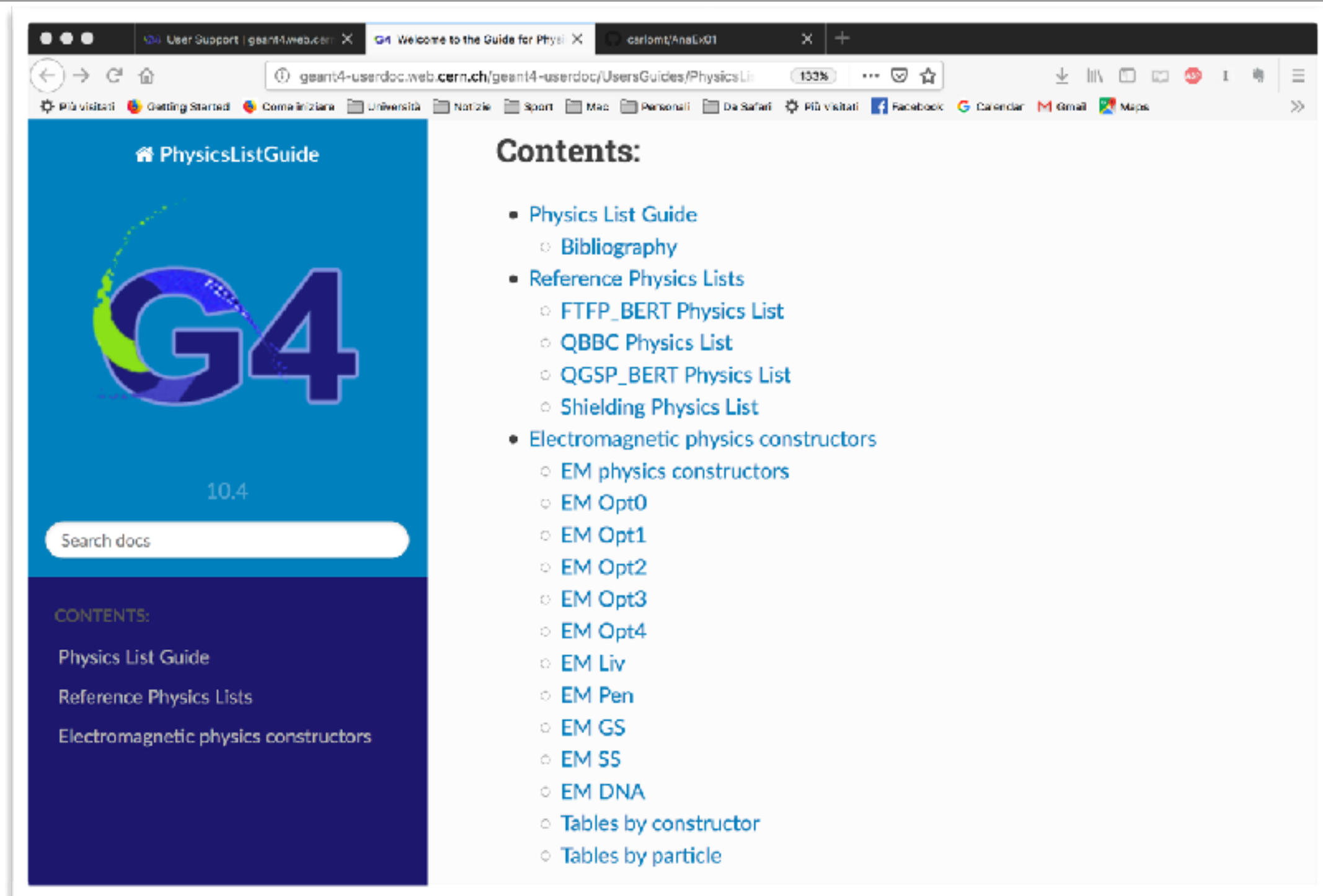
The screenshot shows a web browser window displaying the Geant4 User Support page. The browser's address bar shows the URL www.geant4.org/geant4/support.2. The page features the Geant4 logo and navigation links for Download, User Forum, Contact Us, and Gallery. The main content area is titled "User Support" and lists various resources, including getting started guides, training courses, source code, frequently asked questions, bug reports, user requirements tracker, user forum, documentation (including the Physics Reference Manual), examples, user aids, and contact coordinators. A "Related Links" sidebar on the right lists additional resources like Object Oriented Analysis & Design, Archive, Mailing list subscription, User requirements document (pdf), and Technical Forum. A "printer-friendly version" link is also visible at the bottom of the page.

The Geant4 website

- www.geant4.org
- Documentation
- Application Developers (you!) guide
- Physics Reference Manual
- Physics Lists Guide



Physics List Guide

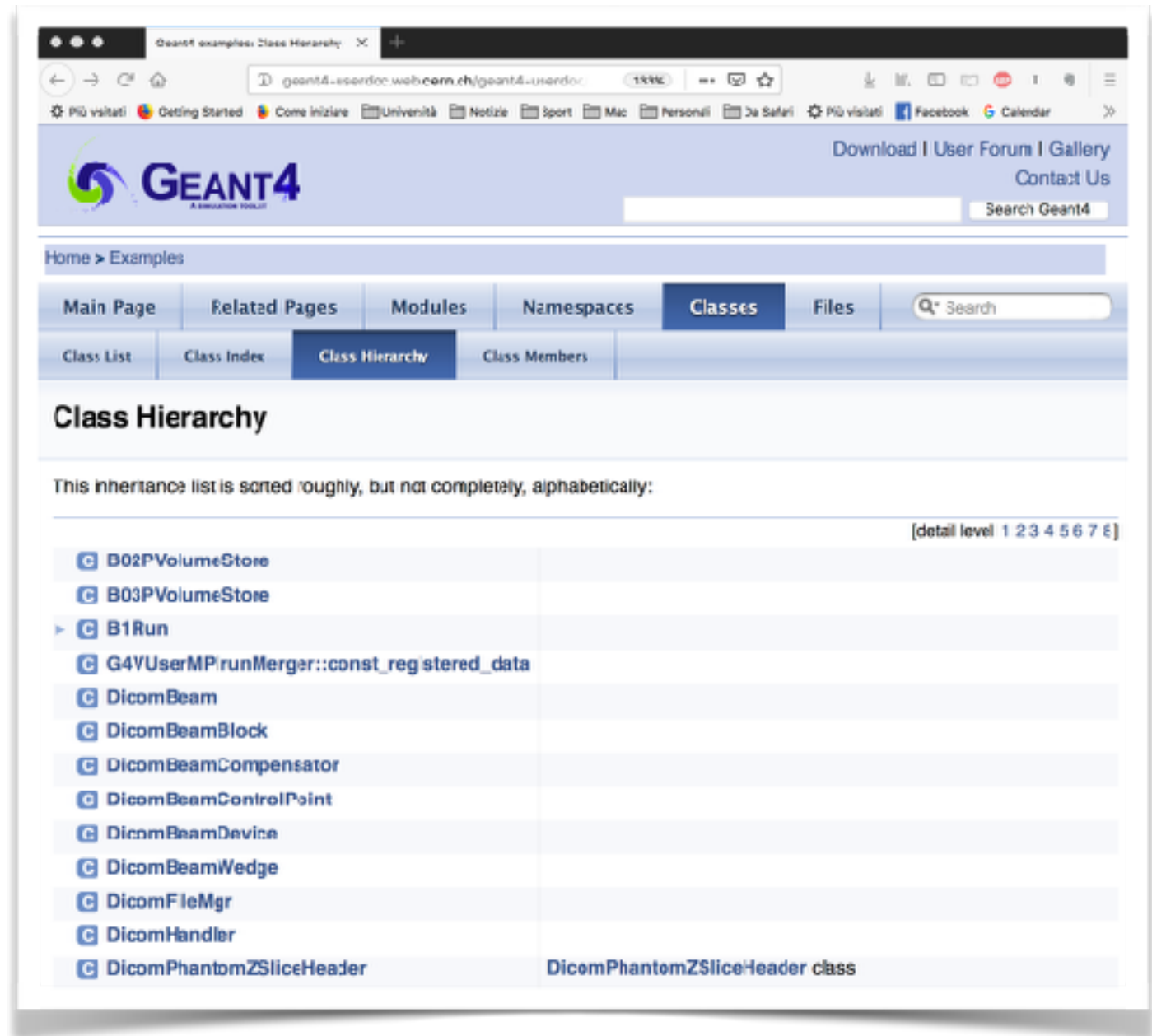


The screenshot shows a web browser window displaying the 'PhysicsListGuide' website. The browser's address bar shows the URL 'geant4-userdoc.web.cern.ch/geant4-userdoc/UsersGuides/PhysicsLi'. The page features a blue header with the 'G4' logo and the version number '10.4'. A search bar labeled 'Search docs' is positioned below the header. The main content area is titled 'Contents:' and lists the following items:

- [Physics List Guide](#)
 - [Bibliography](#)
- [Reference Physics Lists](#)
 - [FTFP_BERT Physics List](#)
 - [QBBC Physics List](#)
 - [QGSP_BERT Physics List](#)
 - [Shielding Physics List](#)
- [Electromagnetic physics constructors](#)
 - [EM physics constructors](#)
 - [EM Opt0](#)
 - [EM Opt1](#)
 - [EM Opt2](#)
 - [EM Opt3](#)
 - [EM Opt4](#)
 - [EM Liv](#)
 - [EM Pen](#)
 - [EM GS](#)
 - [EM SS](#)
 - [EM DNA](#)
 - [Tables by constructor](#)
 - [Tables by particle](#)

Doxygen

- http://geant4-userdoc.web.cern.ch/geant4-userdoc/Doxygen/examples_doc/html/hierarchy.html
- All the class interfaces



The screenshot shows a web browser displaying the Geant4 website. The page title is "Geant4 examples: Class Hierarchy". The browser address bar shows "geant4-userdoc.web.cern.ch/geant4-userdoc/". The page features a navigation menu with tabs for "Main Page", "Related Pages", "Modules", "Namespaces", "Classes", and "Files". The "Classes" tab is selected, and a sub-menu shows "Class List", "Class Index", "Class Hierarchy", and "Class Members". The "Class Hierarchy" sub-tab is active. Below the navigation, the page title "Class Hierarchy" is displayed. A note states: "This inheritance list is sorted roughly, but not completely, alphabetically:". A "detail level" selector is set to "1". The class list includes: B02PVolumeStore, B03PVolumeStore, B1Run (expanded), G4VUserMPirunMerger::const_registered_data, DicomBeam, DicomBeamBlock, DicomBeamCompensator, DicomBeamControlPoint, DicomBeamDevice, DicomBeamWedge, DicomFileMgr, DicomHandler, and DicomPhantomZSliceHeader (labeled as "DicomPhantomZSliceHeader class").



The examples

an overview...

Examples omnia divisa est in partes trees...

- **Basic** set of examples is oriented to novice users and covering the most typical use-cases of a Geant4 application with keeping simplicity and ease of use
- **Extended** set of examples may require some additional libraries besides of Geant4. This set covers many specific use cases for actual detector simulation
- **Advanced** set of examples covers the use-cases typical of a "toolkit"- oriented kind of development, where real complete applications for different simulation studies are provided; may require additional third party products to be built

Where?

- Where to find the examples:
 - `$G4DIR/examples/basic`
 - `$G4DIR/examples/extended`
 - `$G4DIR/examples/advanced`

Basic examples

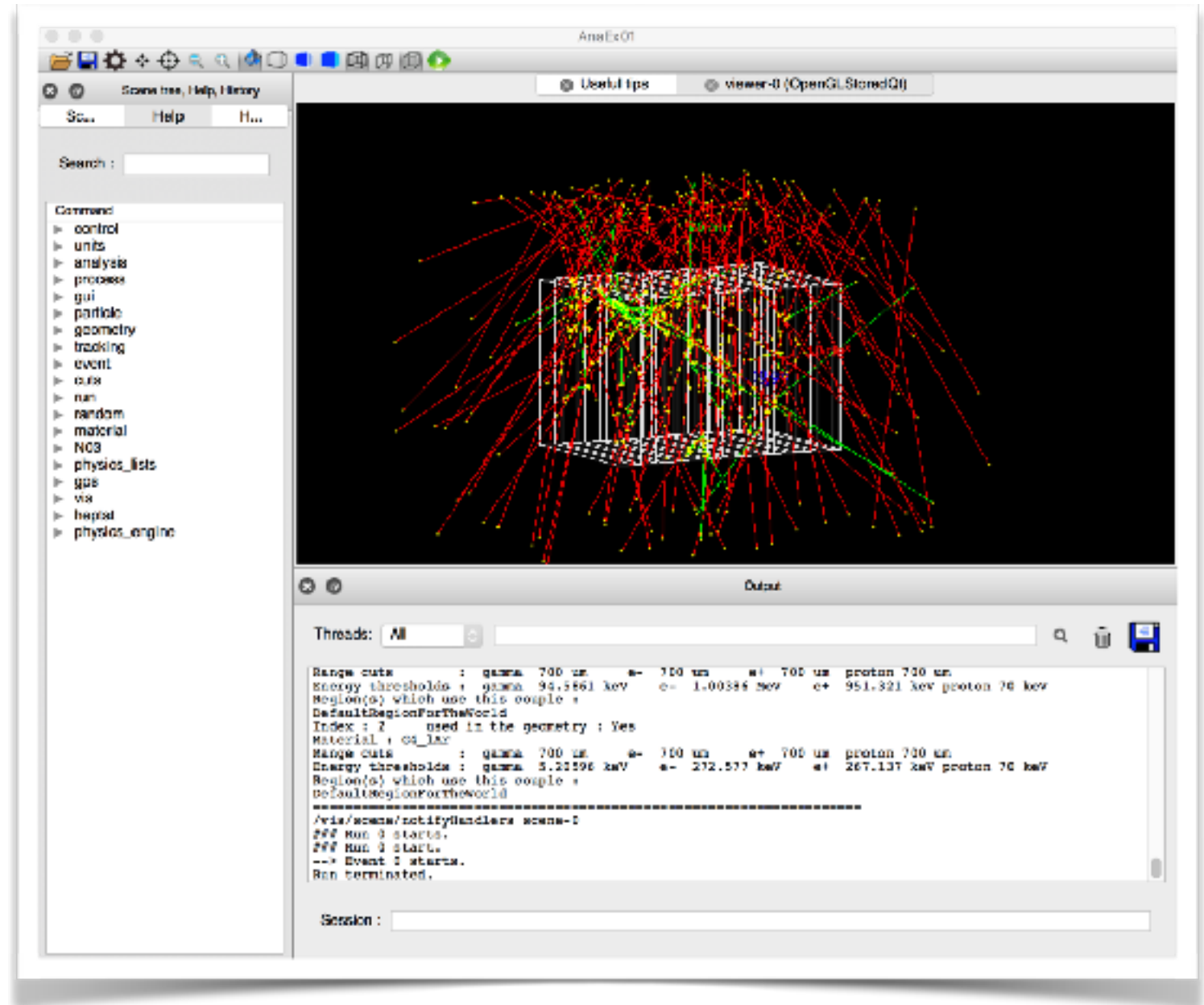
Code name	Few Characteristics
Example B1	<ul style="list-style-type: none"> • Simple geometry with a few solids • Geometry with simple placements (G4PVPlacement) • Scoring total dose in a selected volume user action classes • Geant4 physics list (QBBC)
Example B2	<ul style="list-style-type: none"> • Simplified tracker geometry with global constant magnetic field • Geometry with simple placements (G4PVPlacement) and parameterisation (G4PVParameterisation) • Scoring within tracker via G4 sensitive detector and hits • Geant4 physics list (FTFP_BERT) with step limiter • Started from novice/N02 example
Example B3	<ul style="list-style-type: none"> • Schematic Positron Emitted Tomography system • Geometry with simple placements with rotation (G4PVPlacement) • Radioactive source • Scoring within Crystals via G4 scorers • Modular physics list built via builders provided in Geant4
Example B4	<ul style="list-style-type: none"> • Simplified calorimeter with layers of two materials • Geometry with replica (G4PVReplica) • Scoring within layers in four ways: via user actions, via user own objects via G4 sensitive detector and hits and via scorers • Geant4 physics list (FTFP_BERT) • Histograms (1D) and ntuple saved in the output file • Started from novice/N03 example
Example B5	<ul style="list-style-type: none"> • A double-arm spectrometer with wire chambers, hodoscopes and calorimeters with a local constant magnetic field • Geometry with placements with rotation, replicas and parameterisation • Scoring within wire chambers, hodoscopes and calorimeters via G4 sensitive detector and hits • Geant4 physics list (FTFP_BERT) with step limiter • UI commans defined using G4GenericMessenger • Histograms (1D, 2D) and ntuple saved in the output file • Started from extended/analysis/A01

Basic examples

Code name	Few Characteristics
<div data-bbox="57 609 186 921" style="border: 1px solid green; padding: 5px; display: inline-block; transform: rotate(-90deg); transform-origin: left top;">Basic!</div> Example B1	<ul style="list-style-type: none"> • Simple geometry with a few solids • Geometry with simple placements (G4PVPlacement) • Scoring total dose in a selected volume user action classes • Geant4 physics list (QBBC)
Example B2	<ul style="list-style-type: none"> • Simplified tracker geometry with global constant magnetic field • Geometry with simple placements (G4PVPlacement) and parameterisation (G4PVParameterisation) • Scoring within tracker via G4 sensitive detector and hits • Geant4 physics list (FTFP_BERT) with step limiter • Started from novice/N02 example
<div data-bbox="57 1120 186 1790" style="border: 1px solid orange; padding: 5px; display: inline-block; transform: rotate(-90deg); transform-origin: left top;">A bit complex</div> Example B3	<ul style="list-style-type: none"> • Schematic Positron Emitted Tomography system • Geometry with simple placements with rotation (G4PVPlacement) • Radioactive source • Scoring within Crystals via G4 scorers • Modular physics list built via builders provided in Geant4
Example B4	<ul style="list-style-type: none"> • Simplified calorimeter with layers of two materials • Geometry with replica (G4PVReplica) • Scoring within layers in four ways: via user actions, via user own objects via G4 sensitive detector and hits and via scorers • Geant4 physics list (FTFP_BERT) • Histograms (1D) and ntuple saved in the output file • Started from novice/N03 example
Example B5	<ul style="list-style-type: none"> • A double-arm spectrometer with wire chambers, hodoscopes and calorimeters with a local constant magnetic field • Geometry with placements with rotation, replicas and parameterisation • Scoring within wire chambers, hodoscopes and calorimeters via G4 sensitive detector and hits • Geant4 physics list (FTFP_BERT) with step limiter • UI commans defined using G4GenericMessenger • Histograms (1D, 2D) and ntuple saved in the output file • Started from extended/analysis/A01

My example

- <https://github.com/carlomt/AnaEx01>
- A modified version of extended/AnaEx01
- output in root files
- input in GPS
- example of cosmic muons...



thank you for your attention!