

Code Repository: Status and Future

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on behalf of

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<http://hepwww.ph.qmul.ac.uk/~white/accodes/>

Introduction and Background

Agreement at 1st ELAN meeting (5/5/04) on need for
www-based code repository.

For each code:

- short description

- access to source code/executable

- some examples of output

- documentation/notes

Glen White has set up a first version:

<http://hepwww.ph.qmul.ac.uk/~white/accodes/>

Home Page

<http://hepwww.ph.qmul.ac.uk/~white/accodes/>



Accelerator Codes Database



This website is set up and maintained on behalf of the European Linear Accelerator Network ([ELAN](#)). The aim is to maintain a database of accelerator codes used by the linear accelerator community providing links to the latest code versions. In addition, some information regarding the usage of these codes is provided by including links to related projects.

- [Codes Database](#)
- [Links](#)
- [Example Projects](#)
- [Contacts / Support](#)

Please [email](#) with updates to this website.

[Website maintained by G.White QMUL, UK.](#)



Site currently under construction.

Codes Database Page

<http://hepwww.ph.qmul.ac.uk/~white/accodes/codedeb.htm>



Accelerator Codes Database



A table of available accelerator codes is shown below, click on the name of the code for detailed information and links to that code. A key describing the column headers is provided below the main table.

Please [email](#) with updates/revisions or suggestions.

Code	CV	OS	SA	SC	BB	BD	SP	PL
GUINEA-PIG	1.3	W,U	Y	C	Y	-	Y	-
CAIN	2.1e	W?,U	Y	F77	Y	-	Y	-
MERLIN / MATMERLIN	2.2	W,U	Y	C++	-	R	-	-
LIAR / MATLIAR	2.3	W,U	Y	F90	-	S,R	-	-
PLACET	0.81	U	Y	C	-	S	-	-
MAD(8,X)	X2.0	W,U	Y	C,F77&90	-	R	-	-
DIMAD	2.9	W,U	Y	F90	-	R	-	-
TRANSPORT	1.6	U,O	Y	F77	-	T	-	-
TURTLE	1.6	U	Y	F77	-	T	-	-
BDSIM	?	U	?	C++,GEANT4	-	R	Y	-
BRAHMS	?	U	?	F77,GEANT3	-	R	Y	-

Key:

- **CV:** Current production version.
- **OS:** Supported Operating System(s), **W**= MS Windows (NT,2000,XP), **U**= Unix / Linux, **O**=other (e.g. VMS, MacOS).
- **SA:** Source code Available? (**Y/N**). **\$**= Binaries only available at a cost.
- **SC:** Programming language of Source Code.
- **BB:** Code is used to simulate Beam-Beam interactions.
- **BD:** Beam Dynamics incorporated. **S**= slice tracking, **R**=ray tracing, **T**=Transport matrix calculation only.
- **SP:** Code can model secondary particle production and tracking.
- **PL:** Code is of type used for laser-plasma accelerator models.

Example 1: GUINEA PIG Page

<http://hepwww.ph.qmul.ac.uk/~white/accodes/guinea.htm>



Accelerator Codes Database



GUINEA-PIG

Author

[Daniel Schulte](#), CERN.

Short Description

GUINEA-PIG simulates the collision of 2 electron/positron beams. It provides data on the Luminosity of the collision as well as a range of information about the collision event- including beam-beam deflection, outgoing beams and secondary particle production in the field of the beam-beam collision.

Binaries

- [Linux \(Redhat7.3 on P4\)](#)
- [Windows \(NT/2000/XP\)](#)

Source Code

- [GUINEA-PIG source code \(V1.3\)](#)
- [FTW libraries also required.](#)

Manuals

- [Manual written by NLC collaboration.](#)
- [Original manual \(Appendix of D.Schulte's Thesis\).](#)

Links

Phi

- [Some more information on the NLC simulation pages.](#)
- [NLC beam-beam interactions project webpage.](#)
- [FONT simulation work.](#)

1/04

Example 2: MERLIN Page

<http://hepwww.ph.qmul.ac.uk/~white/accodes/merlin.htm>



Accelerator Codes Database



MERLIN/MATMERLIN

Author

[N. Walker](#), DESY.

Short Description

Merlin is a C++ class library for performing charged particle accelerator simulations. The current release of the library contains over 230 classes and has been nearly five years in development. Originally designed for simulations of linear collider beam dynamics, it has recently been extended to include the more traditional storage ring physics.

The library can be loosely divided into two parts:

- Accelerator Model description
- Simulations (beam dynamics) simulation

The model of the accelerator system being studied contains only a description of the physical components (e.g. magnets, diagnostics, vacuum chambers, cavities, power supplies, support structures.) The classes responsible for performing the required beam dynamics simulations use this information to construct the more abstract *algorithm* related representation of the model (e.g. construction of a map for particle tracking.) In this respect, the accelerator model can be thought of as a form of database.

This separation allows (in principle) the same accelerator model to be used repeatedly for different forms of beam dynamics simulations, without the need to modify the accelerator model code directly. Currently, the only *beam dynamics* package supported is particle tracking (i.e. ray tracing.)

MatMerlin is an extension to Merlin to allow its use within the Matlab environment. Not all the functionality of the full Merlin code is yet incorporated within MatMerlin.

Binaries

Philip

- [Windows V2.2 \(NT/2000/XP\)](#) (Merlin)
- [Linux V2.2](#) (Merlin)
- [Windows V2.2 \(MatMerlin\)](#) (Matlab R13)

/11/04

Projects Page

<http://hepwww.ph.qmul.ac.uk/~white/accodes/projects.htm>



Examples of Projects

FONT Simulation Group

The FONT simulation group uses a variety of tracking codes to perform LINAC to IP tracking for TESLA/NLC to optimise the fast feedback systems and assess the performance of the Linear Collider in the presence of ground motion.

- [Simulation group web page.](#)

Links Page

<http://hepwww.ph.qmul.ac.uk/~white/accodes/links.htm>



Accelerator Codes Database



Useful Links

- [ELAN](#)
- [CARE](#)
- [1st ELAN workshop, Frascati, May 2004](#)
- [NLC Simulation codes page](#)

Contacts + Support Page

<http://hepwww.ph.qmul.ac.uk/~white/accodes/contacts.htm>



Contacts & Support

- [Website manager.](#)
 - [BDYN workpackage leader.](#)
-

Mailing Lists:

- ELAN
- BDYN WP
-

Possible Additions

- **BDSim**
- **BRAHMS**
- **Injector / bunch compressor codes**
- **Electron cloud codes**
- **Instability codes**
- **Documentation: papers ...**
- **...**

QMUL High Throughput Cluster (HTC)

- 174 x 2 GHz cpus
- 40 TB attached storage
- GBit ethernet
- Peak capacity:
50k cpu-hours/week
- **400k cpu-hours used for
LC simulations so far**
- **Another 2-300 'boxes'
by Spring 06**



Closing Remarks

- Code repository only makes sense if people use it
- Glen has made an excellent start
- Comments on www site very welcome
- Currently well stocked with Linear Collider codes
- Suggestions for additions very welcome
- Authors should email contributions and/or updates
to Glen: g.white@qmul.ac.uk