

Status of MCDB Project

L. Dudko, SINP MSU
on behalf of LCG MCDB group

<http://mcdb.cern.ch>

LCG MCDB group:

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*A. Sherstnev, Univ. of
Oxford*

OUTLINE:

- MCDB outlook
- MCDB usage
- Development plans

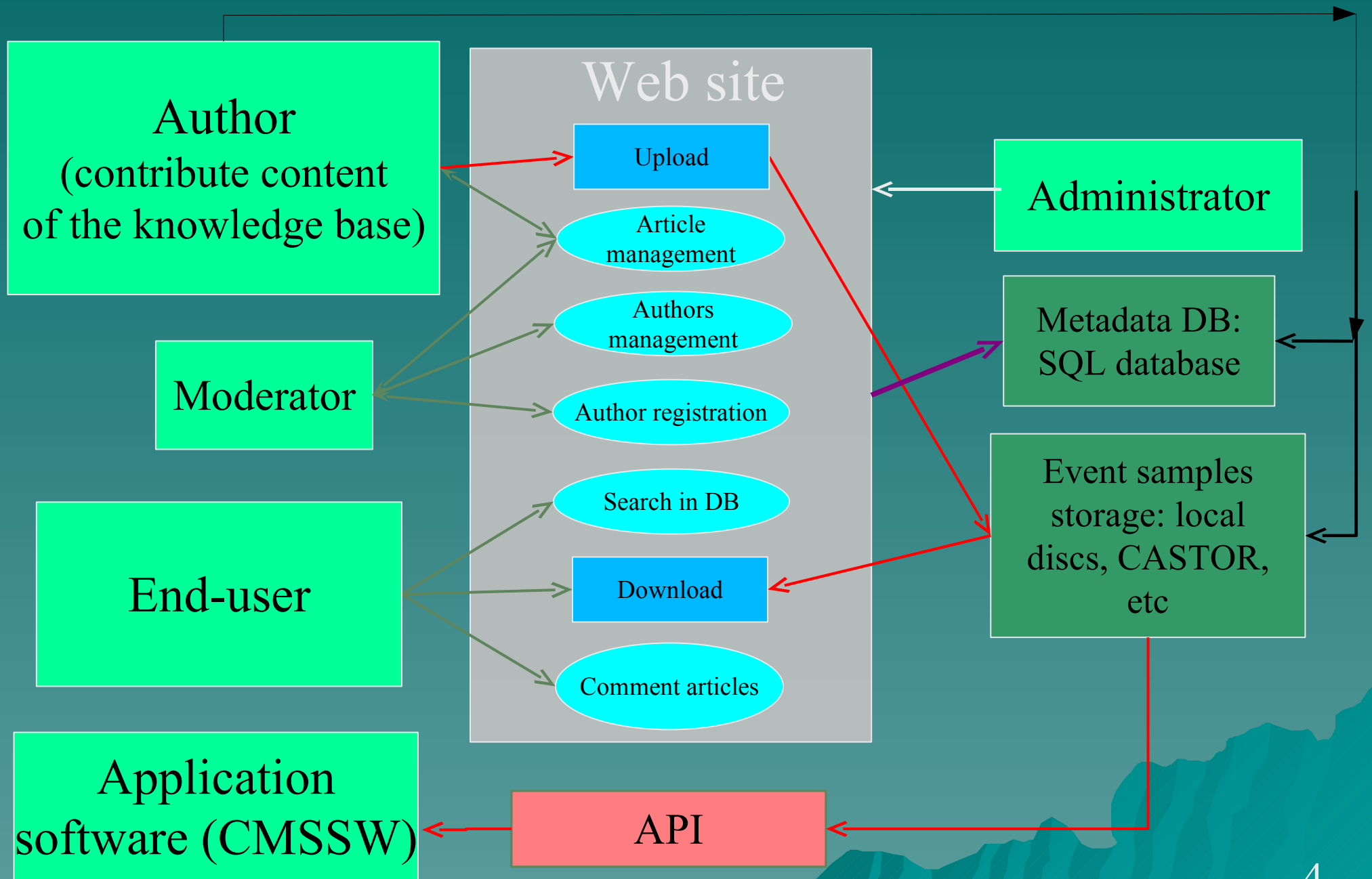
What is MCDB?

- The LCG MCDB knowledge base is developed to store and document sophisticated event samples simulated for the LHC collaborations by experts
- MCDB Provides infrastructure to keep MC samples and sample documentation
- Facilitates communication between MC experts and users in LHC collaborations

General Structure of MCDB?

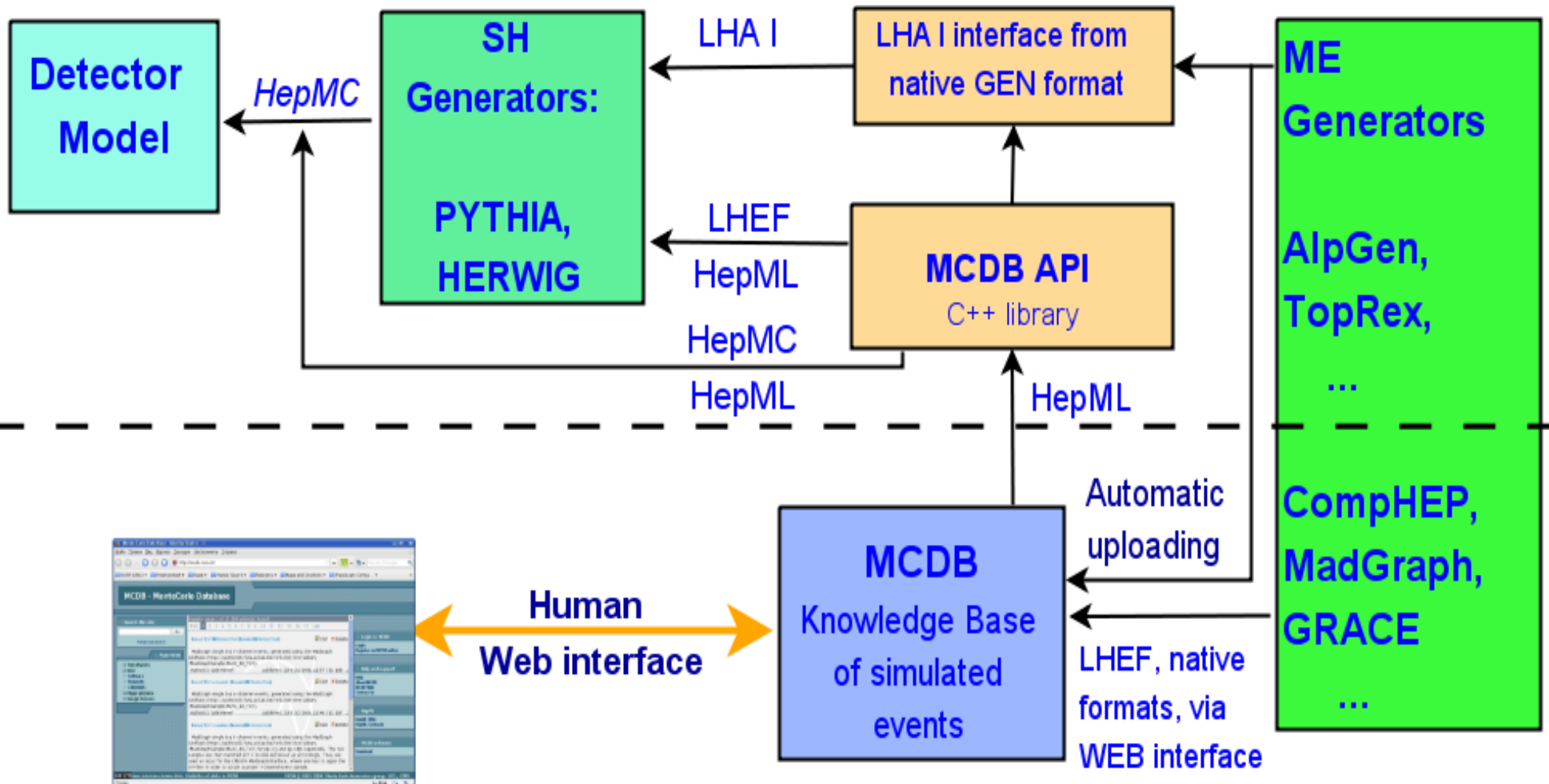
- **Core MCDB:**
 - ◆ **Web Content Management System**
 - ◆ **Data Base of the information (MySQL)**
 - ◆ **Storage of the samples (CASTOR)**
- **MCDB Interfaces**
 - ◆ **MCDB API: an interface to get information from MCDB automatically (by external software clients)**
 - ◆ **Uploading Interface: automated uploading of new samples and new information to MCDB**
- **All Interfaces are based on HepML specifications**

LCG MCDBB Scheme



MCDB in the Global Simulation Chain

CMSSW Simulation Chain



Current Usage of MCDB (I)

- ◆ MCDB samples are available for all experiments, but for a while the main consumer is CMS.
 - All externally generated samples for the official CMS production should be accessible in MCDB in LHEF format
 - During the production, CMSSW process these events automatically by means of LHEInterface (MCDB API is the part of the interface – MCDBSource)

<https://twiki.cern.ch/twiki/bin/view/CMS/MCDBCMSWInterface>

Current Usage of MCDB (II)

- ◆ On the side of Authors/Users statistics:
 - 36 registered authors (not only CMS people, but ATLAS and theory people as well)
 - 234 articles
 - More than 4000 unique visits during the last 3 years

Open Issues for Farther Development

- ◆ Content Management System:
 - Improvements and bugfixing for the Import Files Tab (tracking is in Savannah)
 - Reorganization of the templates system in order to be more convenient for the user
- ◆ Logging subsystem improvements
- ◆ Server hardware
 - HDD partitions reconfiguration

Issues for Development

◆ Interfaces

- Move API to HepML 0.2 specifications
- Add HepML 0.2 parsing for the uploading
- Implementation of the Uploading from CMS Grid sites

◆ Storage subsystem

- Currently MCDB uses CASTOR, but users discover some instabilities with CASTOR
- Improvement of caching and, probably, a Grid storage is needed

General Plans of the Project

- ◆ Reorganization of the code tree and migration to SVN
- ◆ Prepare the software in the form of RPM packages with necessary installation scripts
- ◆ Publish the MCDB software in HepForge as an Open Source project
- ◆ Completely distinguish the HepML part as a separate code and publish LibHepML as a separate Open Source project

Conclusion

- ◆ MCDB project provides powerful tool to handle events from external ME generators
- ◆ MCDB is the official part of the MC simulation chain in CMS
- ◆ LCG MCDB team provides support for this project and necessary developments
- ◆ All of the developed software will be published as an Open Source and available for independent usage and developments

BACKUP SLIDES

The Major Features of LCG MCDB (I)

- ◆ Powerful WEB interface with Content Management System for the authors of event samples and end-users
- ◆ Tree graph of physics categories with articles published in MCDB to browse the database content
- ◆ Power search engine based on SQL/XML to search the content of the knowledge base
- ◆ Flexible and reliable authorization system based on CERN AFS/Kerberos logins or LCG GRID certificates
- ◆ SQL structure of event sample documentation
- ◆ BackUp of samples and SQL information

The Major Features of LCG MCDB (II)

- ◆ CASTOR is the native storage for the event samples
- ◆ Direct uploading of multiple files from AFS/CASTOR/GRID (wild-card characters are possible) to LCG MCDB
- ◆ Direct downloading of files from LCG MCDB (CASTOR) with HTTP/RFIO/GridFTP/... (URI)
- ◆ Application Programming Interface (API) for the LHC collaborations environment software
- ◆ LHEF/HepML unification of event file format and sample description

MCDB Interfaces

- ◆ **WEB Interface** is convenient for interactive work
 - USERS can **browse, download, comment**
 - AUTHORS can **upload and document** new samples or **modify** the old one
- ◆ **MCDB API** is the automatic way to **access** the samples and their documentation from external software (e.g. CMSSW)
- ◆ **Automatic uploading** interface is the automatic way to **upload and document** new samples

Login to the authors area

Search this site

Advanced search

- Main MENU
- Top physics
 - Exotic production
 - Single top
 - QCD tt
 - QCD
 - B physics
 - multijets
 - Software
 - Requests
 - Higgs physics
 - Gauge bosons
 - Gamma and jets
 - 2gamma and jets
 - W and jets
 - WW and jets
 - Z and jets
 - ZZ and jets

Categories

FEEDBACK COMMENTS

Please, provide your feedback comments on the LCG MCDB project, here
published: 16th May 2005, 13:40 | author(s): Lev Doudko

PROCESS PP->H->ZZ->4MU

The event sample simulates the inclusive Higgs production with decay to four muons (viz Z-bosons). It is created by the CompHEP Monte-Carlo generator. The Higgs mass value is 500 GeV. All used physics parameters and applied cuts can be found in a prt file stored in the article.
published: 19th Sep 2005, 09:42 | author(s): Alexander Sherstnev

W+ AND 3 JETS

These events were prepared by CompHEP in a special hash-model, where 2 first quark generations are unified to one of hash-quarks. See details in the article itself.
published: 29th Sep 2005, 14:51 | author(s): Alexander Sherstnev

QCD Z(2TAU)+3J EVENTS WITH ALPGEN2

Events for the Z+3jets production. Z-boson decays to tau lepton pair. The events were prepared with ALPGEN Monte-Carlo generator. They can be used for the MLM ME-PS matching procedure, since generated with ickkw=1. All generation parameters and cuts applied can be viewed in the qcd_2tau3j_unw.par parameter file.
published: 18th Oct 2005, 12:20 | author(s): Alexander Nikitenko

WEB Interface

Login to MCDB
Login

Registration
Register as MCDB author
Moderators list

Help and support
Help
About MCDB
Contact us

New author registration

Articles abstracts

Process pp->H->ZZ->4mu

Author(s): Alexander Sherstnev

Date of publication: 2005-09-19 09:42:37, **Last correction:** 2005-09-29 14:47:24

Categories: H and Z/W

Article ID: 34

Abstract:

The event sample simulates the inclusive Higgs to four muons (viz Z-bosons). It is created by generator. The Higgs mass value is 500 GeV, and applied cuts can be found in a prt file stored

Author comments:

Process:
p,p->H->mu+,mu-,mu+,mu-

Subprocess:
G,G->mu+,mu-,mu+,mu- (cross section = 0.6)

Process:

Name: pp --> mu,mu,mu,mu
PDF set: CTEQ5L
QCD scale: sqrt(S)

Model: SM, Feynman gauge

Generator: CompHEP, version: 4.2.1

Other information:

Cuts:

5 GeV < Invariant_mass_1 < 400 GeV
3 GeV < $P_t(\mu)$
 $|\eta(\mu)| < 2.4$
5 GeV < Invariant_mass_2 < 400 GeV

Event files

File: events_MH500_wHCHep_BM1.pev
Size: 28200663 bytes
Cross section: 6.0382E-04pbn
Events number: 100000
Castor Path: waiting for migration (in a few hours)
Comments: Number of mixed reweighted events = 100000 (1 subprocess)

File: prt_MH500_wHCHep_Q2Shat [\(download\)](#)
Size: 2682 bytes
Cross section:
Events number: 0
Castor Path: waiting for migration (in a few hours)
Comments: CompHEP kinematics module

MODEL:

SM, Feynman gauge

NAME: SM, Feynman gauge

DESCRIPTION:

PARAMETERS:

| PARAMETER | VALUE | DESCRIPTION |
|-------------|---------|-------------|
| m_s | 0.117 | |
| m_b | 4.85 | |
| GG | 1.21358 | |
| m_t | 1.77699 | |
| S_W | 0.48076 | |
| M_{HIGGS} | 115 | |
| s_{12} | 0.2229 | |
| m_c | 1.65 | |
| M_{top} | 174.3 | |
| EE | 0.31345 | |
| s_{23} | 0.0412 | |
| m_μ | 0.10566 | |
| s_{13} | 0.0036 | |
| M_Z | 91.1876 | |

Article

Download events file

Comments to the article

Theoretical model and parameters

[View/post comments on article](#)
[Edit article](#)

New Authors HOW-TO

(only need if you plan to upload new samples)

- (1) Register as a new author, wait for the confirmation e-mail
- (2) Login to the LCG MCDB authors area
- (3) Choose "Create New Article" in the authors menu
- (4) Fill the fields in the documentation templates, which will appear (title, generator, theoretical model, cuts, ...)
- (5) Upload your event files in the "Event Files" slice
- (6) Click "Preview/Save" slice and check the box "Publish"

Notes:

1. Author needs valid CERN AFS login or LCG digital certificate to be authorized;
2. Author can store unfinished articles and resume to correct them in any moment;
3. Author can edit articles already published on the Web or do the documents publicly inaccessible for a while.

After authorized login to MCDB the additional entries will appear at the right side menu, according to the author permissions

MCDB - MonteCarlo Database

Search this site
Go
Advanced search

Main MENU

- Top physics
- QCD
- Software
- Requests
- Higgs physics
- Gauge bosons

FEEDBACK COMMENTS Edit Delete

Please, provide your feedback comments on the LCG MCDB project, here
published: 16th May 2005, 13:40 | author(s): Lev Doudko ..

PROCESS PP->H->ZZ->4MU Edit Delete

The event sample simulates the inclusive Higgs production with decay to four muons (viz Z-bosons). It is created by the CompHEP Monte-Carlo generator. The Higgs mass value is 500 GeV. All used physics parameters and applied cuts can be found in a prt file stored in the article.
published: 19th Sep 2005, 09:42 | author(s): Alexander Sherstnev ..

W+ AND 3 JETS Edit Delete

Moderator entry

- User management
- Categories management
- View new comments

Author entry

- Create new article
- Edit articles

Help and support

- Help
- About MCDB
- Contact us

0000230 times visited since October 2005

MCDB © 2005 Monte-Carlo Generators group, LCG, CERN

Add/Edit Article link is the gate to the article template system

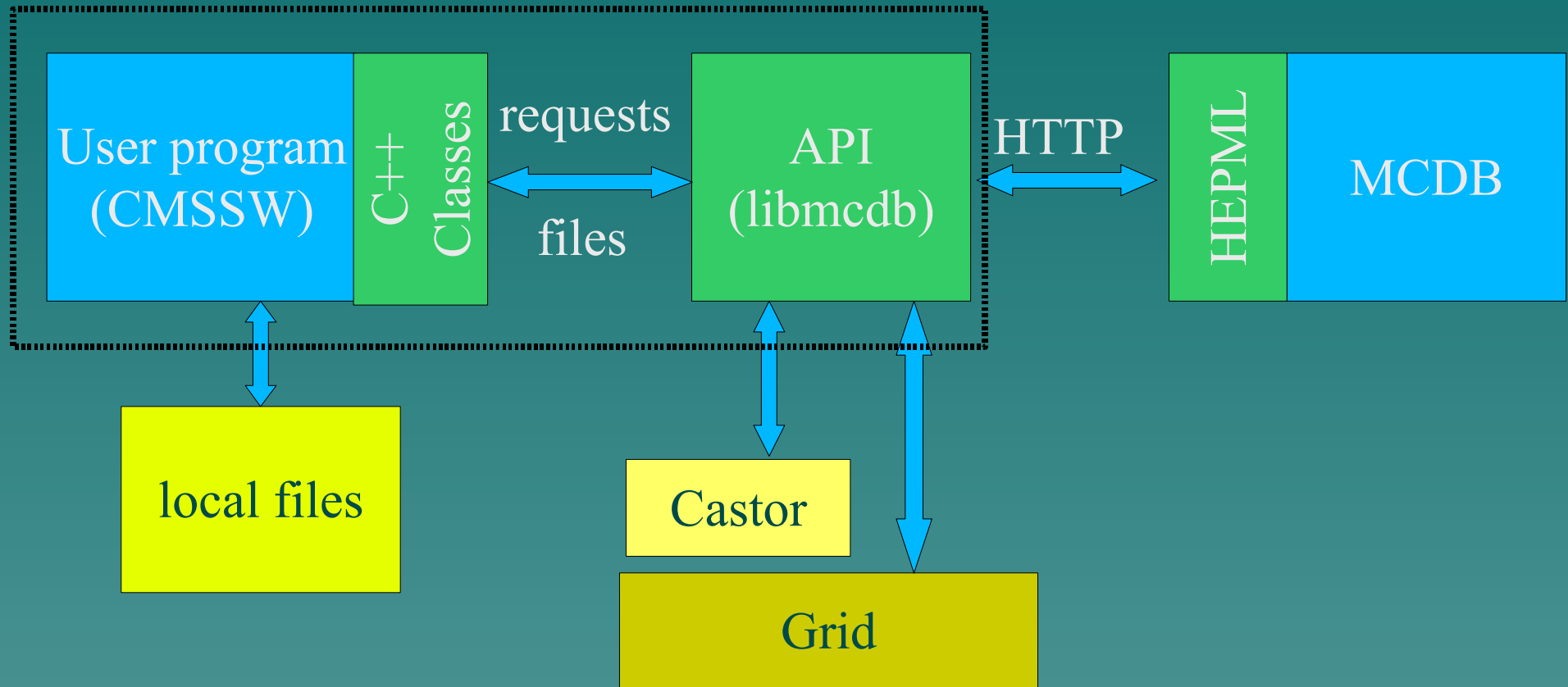
The screenshot displays the MCDB - Monte-Carlo DataBase application window. The title bar includes the LCG logo and the text "MCDB - Monte-Carlo DataBase". The window has a menu bar with "New window - Close window - Help". Below the menu bar is a toolbar with buttons for "Article creating", "New generator", "New process", "New model", and "New cut". A secondary toolbar contains "General information", "Event files", "Generator", "Model", "Process", "Cuts", and "Preview/save".

The main content area is divided into several sections:

- ARTICLE TITLE:** A text box containing "Process pp->H->ZZ->4mu".
- CATEGORIES:** A list box on the left with the following items: Gauge bosons, 2gamma and jets, Gamma and jets, W and jets, WW and jets, Z and jets, ZZ and jets, Higgs physics, H and jets, H and Z/W (highlighted), QCD, B physics, multijets, Requests, and Software.
- GROUP:** A dropdown menu showing "Higgs PRS group".
- EXPERIMENT:** A dropdown menu showing "CMS".
- OTHER GROUP:** An empty text box.
- RESPONSIBLE PERSON:** An empty text box.
- GROUP DESCRIPTION:** An empty text box.
- PRIMARY AUTHOR:** A dropdown menu showing "Alexander Sherstnev, SINP MSU".
- CO-AUTHORS:** A list box containing the following names and affiliations: Alexander Nikitenko, Imperial College, University of London; Alexander Sherstnev, SINP MSU; Anton Gusev, IHEP; Filip Moortgat 2770, CERN; Filippo Ambroglini, University and INFN Perugia; Harinder Singh Bawa, Panjab University Chandigarh; Lucia Silvestris, INFN-Bari; Mikhail Dubinin, SINP MSU; Sergey Belov, JINR; and Vladimir Uzhinsky, JINR, LIT.
- ABSTRACT:** A text box containing the text: "The event sample simulates the inclusive Higgs production with decay to four muons (viz Z-bosons). It is created by the CompHEP Monte-Carlo generator. The Higgs mass value is 500 GeV. All used physics parameters".

The Windows taskbar is visible at the bottom of the screen, showing various system icons and the taskbar itself.

MCDB API - automatic access to MCDB samples from CMSSW production chain



Interface to download the samples and description from MCDB automatically. Realized in CMSSW LHEInterface and MadGraphInterface, CompHEPInterface (partially)

API STEP I: LibMCDB <=> MCDB

- ◆ HTTP request with **ArticleID** and **file name** from API to MCDB server
(e.g. <http://mcdb.cern.ch/cgi-bin/xmlquery.cgi?article=116>)
- ◆ **HepML description** and paths to samples, as an answer from MCDB to API
- ◆ API parses the HepML (XML) block and fill **C++ classes** with the description
- ◆ API makes **local copy of the event sample**, download the remote sample via RFIO, GridFTP, SRM, ...

API STEP II: LibMCDB => CMSSW

- ◆ API provides to CMSSW:
 - local path to file with input events
 - Sample Description in the form of C++ objects described in `mcdb.hpp`
- ◆ CMSSW process the local event file to the next level of simulation
- ◆ CMSSW passes the C++ objects with event description to the output files

LibMCDB Implementation

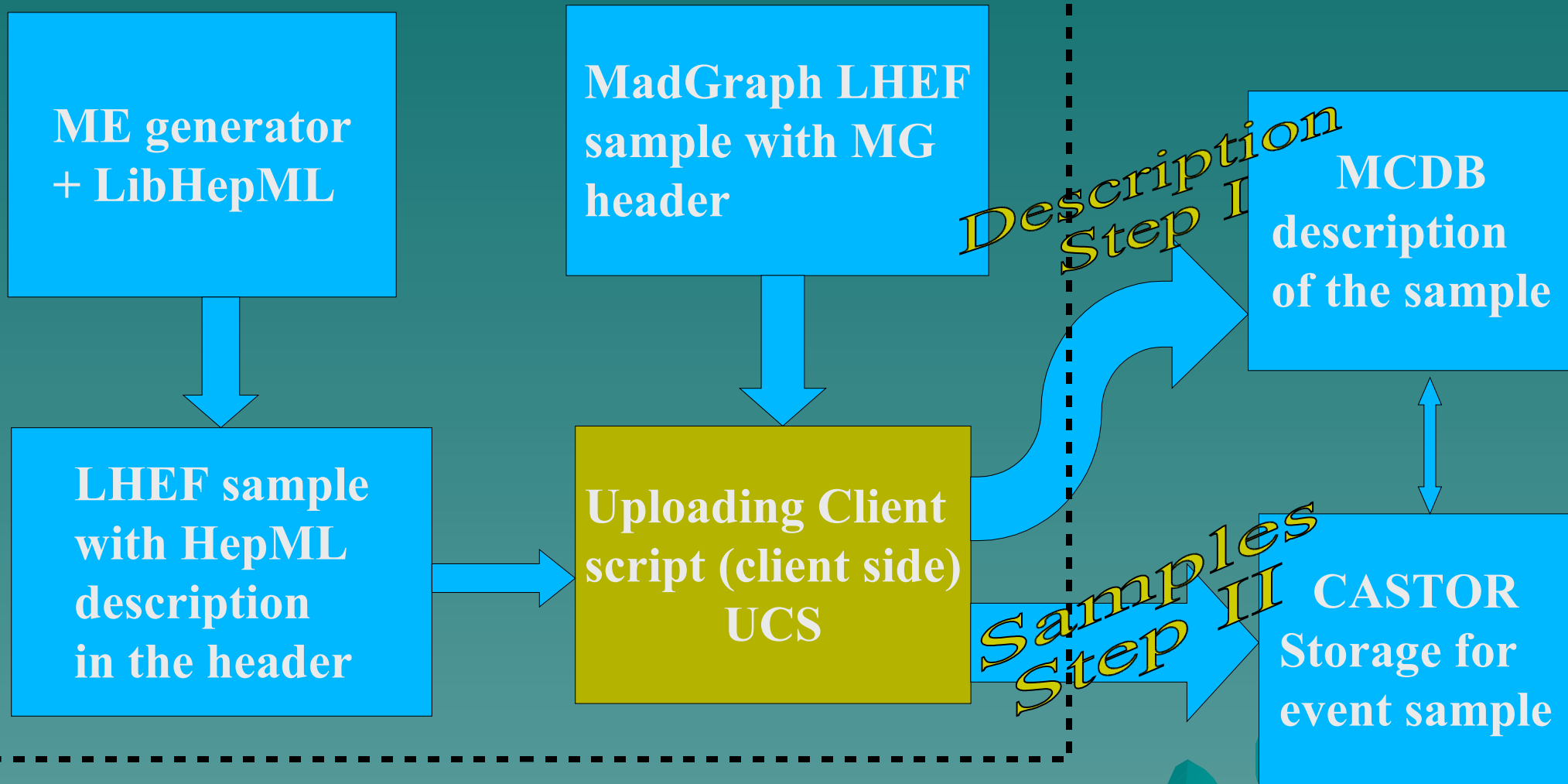
(LibMCDB / MCDB API / LHEInterface / MCDBInterface)

- ◆ Standalone C++ package for everybody (available on MCDB web site)
- ◆ External LCG AA package in `/afs/cern.ch/sw/lcg/external/mcdb/`
- ◆ Integration in CMSSW: LHEInterface (see C. Saout talk), MadGraphInterface, CompHEPInterface

We support all of these implementations for a while.

Automatic Uploading to MCDB

Client Side



Main tasks for Uploading Client

- ◆ Upload LHEF MadGraph/HepML samples and describe it in the new MCDB article, sample description creates automatically from the header of the first sample. The samples upload directly to CASTOR via SRM access.
- ◆ Upload additional samples to existent MCDB article and do not change the description. It is possible to upload all kind of files with this option, not only LHEF samples.

Main tasks for Uploading Client. Cont'd.

- ◆ Replace the description of the samples in the existent MCDB article and upload new files. Data Set Name or Article ID are identifiers for the MCDB Article
- ◆ Describe LHEF sample in new article (automatically create new article), but do not upload any file.

Step I: Uploading Script (UCS) \Leftrightarrow MCDB

- ◆ UCS parses LHEF to find the header block
- ◆ UCS authorizes in MCDB and pass LHEF header to MCDB via HTTP (POST)
- ◆ MCDB parses the LHEF header (HepML or MadGrpah) to find the specific elements of sample description (According to SQL structure)
- ◆ MCDB creates new article and specific directory on CASTOR
- ◆ MCDB returns to UCS ArticleID and GRID directory to upload the sample

Step II: Uploading Script (UCS) => CASTOR

- ◆ UCS Authorizes on CASTOR with Grid certificates: **grid-proxy-init**
- ◆ UCS uploads the sample(s) to the specific incoming CASTOR directory via **lcg-cp**
- ◆ UCS sends request to MCDB to register the uploaded file in the corresponding MCDB article

Possible Uploading Issue:

CASTOR team provides only Storage Resource Manager (SRM) access, by default UCS uses `srm://srm-cms.cern.ch` members of other VO have to use some other gates (`srm-public`, `srm-atlas`, ...), special UCS option is provided: `--srmserver`

Authorization Mechanisms

- ◆ Possible UCS => MCDB authorization
(the corresponding login or DN should be registered in MCDB first as an MCDB author)
 - CERN AFS login/password for UCS
 - LCG PKCS12 certificate + password
 - LCG usercert.pem/userkey.pem from
~/.globus/ require password
 - **grid-proxy-init** (default; no password)
- ◆ UCS => GRID authorization on CASTOR
 - grid-proxy-init (first check with grid-proxy-info)

Notes and Limitations

- ◆ One LHEF header sample description corresponds to one article in MCDB
- ◆ UCS takes samples description from the first file and creates MCDB article
- ◆ All other files are just copied to CASTOR and attached to the same article, but number of events and sample cross section parsed for each sample.
- ◆ Different physics processes should be uploaded by different runs of UCS and described in different MCDB articles
- ◆ In the first version of UCS only MadGraph header is possible, HepML is in progress
- ◆ MCDB Article identifies by Article ID or Data Set Name (the first one has a priority)

HOW TO Use UCS, Task I

The main task is to describe the set of LHEF (MadGraph or HepML header) files in MCDB as the new article and upload the files to specific CASTOR directory.

./upload2mcdb.pl file1 file2 ...

Description for the new MCDB article will be taken from the header of file1 but all other files will be uploaded and attached to the same article.

Possible additional options:

- dsname DataSetName #specify Data Set Name
- header [MG, hepml] #specify type of LHEF header (MG - MadGraph, hepml - HepML header)
- authors AFSlogin1,AFSlogin2,... #set additional authors for the article
- category Category1,Category2,... #set MCDB Category where to attache article (default is CMS08MG)
- not2web #do not post Article to WEB (keep in MCDB), default is post right after it is described
- verbose #be verbose during the run
- debug #print additional information during the session

HOW TO Use UCS, Task II

Upload more samples to the existing MCDB article

- Requires ArticleID or DataSetName to identify where to attach the samples
- Do not change the description
- Not only LHEF format is possible

upload2mcdb.pl [-artid N] [-dsname DataSetName] --uploadonly file1 file2 ...

Possible options:

- verbose #be verbose during the run
- debug #print additional information during the session

HOW TO Use UCS, Task III

Replace the description in the existing article and upload new files

```
upload2mcdb.pl [-artid N] [-dsname DataSetName] --replace file1  
file2 ...
```

Possible options:

| | |
|--|--|
| <code>-dsname DataSetName</code> | <code>#specify Data Set Name (analog ArticleID)</code> |
| <code>-header [MG or hepml]</code> | <code>#specify type of LHEF header (MG - MadGraph, hepml - HepML header)</code> |
| <code>-authors AFSlogin1,AFSlogin2,...</code> | <code>#set additional authors for the article</code> |
| <code>-category Category1,Category2,...</code> | <code>#set MCDB Category where to attache article (default is CMS08MG)</code> |
| <code>-not2web</code> | <code>#do not post Article to WEB (keep in MCDB), default is post right after it is described</code> |
| <code>-verbose</code> | <code>#be verbose during the run</code> |
| <code>-debug</code> | <code>#print additional information during the session</code> |

HOW TO Use UCS, Task IV

Describe sample in new article but do not upload any file to CASTOR.
The description is taken from the header of the file

upload2mcdb.pl --descriptiononly file1

Possible additional options:

- | | |
|-----------------------------------|---|
| -dsname DataSetName | #specify Data Set Name |
| -a [login, pkcs12, cert, globus] | #type of authorization in MCDB, default is globus |
| -header [MG, hepml] | #specify type of LHEF header (MG - MadGraph, hepml - HepML header) |
| -authors AFSlogin1,AFSlogin2,... | #set additional authors for the article |
| -category Category1,Category2,... | #set MCDB Category where to attache article (default is CMS08MG) |
| -not2web | #do not post Article to WEB (keep in MCDB), default is post right after it is described |
| -verbose | #be verbose during the run |
| -debug | #print additional information during the session |

HOW TO Get Help on Uploading Client Script

Get the Uploading Client Script

(download section of MCDB)

```
wget http://mcdb.cern.ch/distribution/upload2mcdb.pl
```

Short help. Get the list of available options:

```
./upload2mcdb.pl -h
```

Long help. Get the detailed description with examples:

```
./upload2mcdb.pl --help
```

Advanced Search Query

Searching for Article, define conditions Experiment Show Info [FS] / [M]

+ Article X

Key words Z
any

Novelty last month

Inverse apply

Author X

Key words
any

Inverse do not use

+ Experiment X

Inverse do not use

Submit Query

PROCESS PP->H->ZZ->4MU Edit Delete

The event sample simulates the inclusive Higgs production with decay to four muons (viz Z-bosons). It is created by the CompHEP Monte-Carlo generator. The Higgs mass value is 500 GeV. All used physics parameters and applied cuts can be found in a prt file stored in the article.

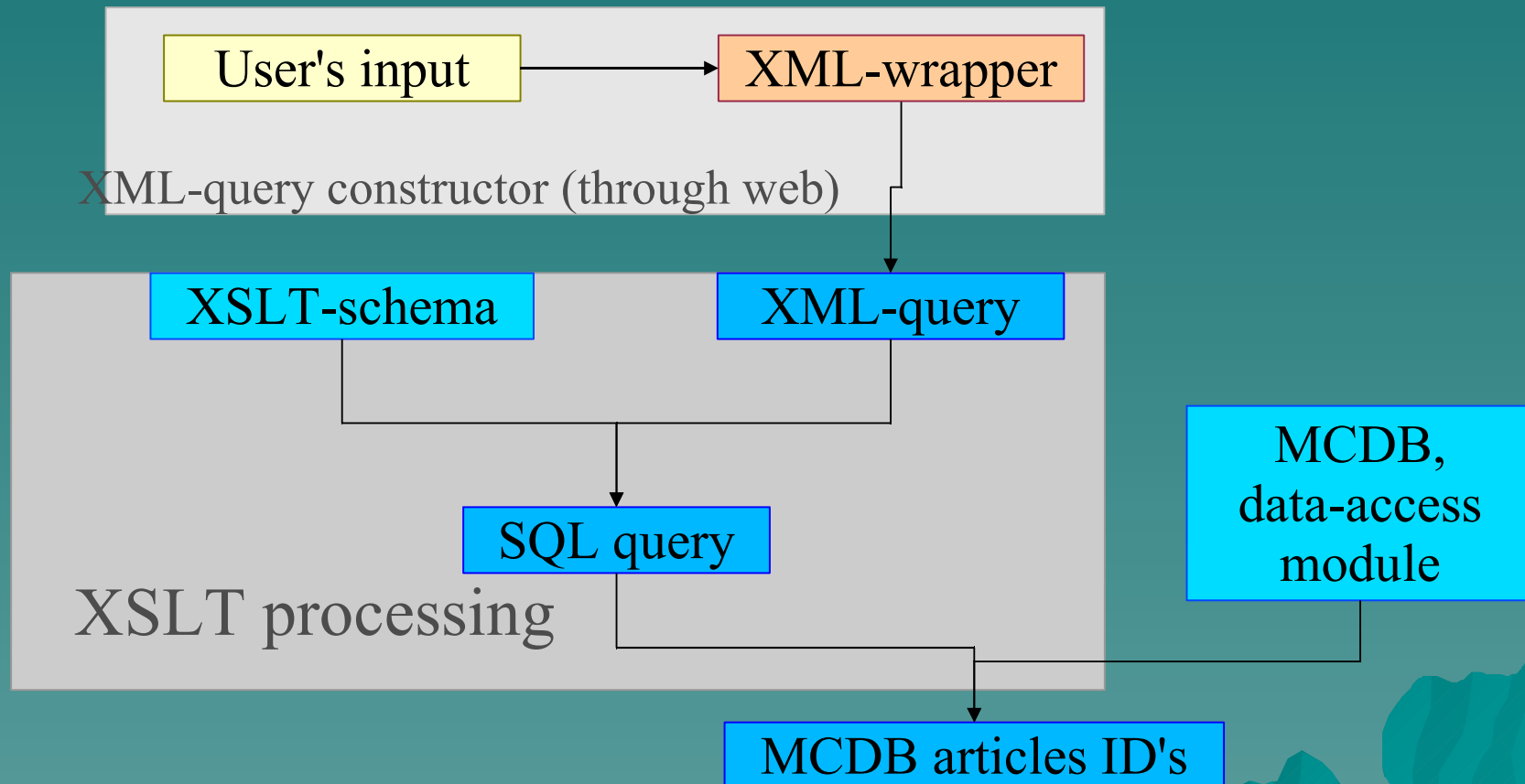
published: 19th Sep 2005, 09:42 | author(s): Alexander Sherstnev ..

W+ AND 3 JETS Edit Delete

These events were prepared by CompHEP in a special hash-model, where 2 first quark generations are unified to one of hash-quarks. See details in the article itself.

MCDB Search Engine

- *dynamic* query construction wizard (JavaScript/XML/SQL)
- Search by many possible criteria with complicated relations between DB-objects



Users Comments Interface

PROCESS PP->H->ZZ->4MU Edit Delete

The event sample simulates the inclusive Higgs production with decay to four muons (viz Z-bosons). It is created by the CompHEP Monte-Carlo generator. The Higgs mass value is 500 GeV. All used physics parameters and applied cuts can be found in a prt file stored in the article.

published: 2005-09-19 09:42:37 | author(s): Alexander Sherstnev

Comments:
[Moderate]

YOUR NAME:

E-MAIL:

COMMENTS:

Done

- Form to send a request for the authorization as new LCG MCDB author.

- Necessary only you want to upload new MC samples

MCDB registration

Please provide following information to register
All fields are required (and at least one of *)

First name:

Last name:

CERN AFS login: *

DN from LCG certificate: *

Experiment:

Group:

Organization:

E-mail:

* At least one of fields *Login* or *DN* **must** be filled.
To get DN you can examine you personal LCG certificate or load it to your browser (instructions [here](#))

Register Cancel

Event files slice to manage event files attached to the article

MCDB - Monte-Carlo DataBase

Article creating | New generator | New process | New model | New cut

General information | **Event files** | Generator | Model | Process | Cuts | Preview/save

FILES MANAGEMENT: **LIST** :: **UPLOAD** :: **IMPORT**

:: **UPLOADED FILES:**

| File | Size | Events | C-Section | CS-Errors | Edit |
|--|----------|--------|-----------|-----------|------|
| <input type="checkbox"/> kis_user.F | 5192 | 0 | 0 | 0 | Edit |
| <input type="checkbox"/> tq_tqb_tot.pev53461813 171373 | 27.66 pb | 0.04 | | | Edit |
| <input type="checkbox"/> prt_tq.tgz | 6065 | 0 | 0 | 0 | Edit |

EVENTS NUMBER:

CROSS SECTION:

CROSS SECTION ERROR:

COMMENTS:

Wild-cards
are possible

MCDB - Monte-Carlo DataBase

Article creating | New generator | New process | New model | New cut

General information | Event files | Generator | Model | Process | Cuts | Preview/save

FILES MANAGEMENT: **LIST** :: **UPLOAD** :: **IMPORT**

:: **IMPORT FILE(S) FROM AFS OR CASTOR**

as list / table

| <input checked="" type="checkbox"/> | Perm | Items | Owner | Group | Size | Month | Day | Time | File |
|-------------------------------------|--------------|-------|-------|-------|------|-------|------|--------|------|
| <input checked="" type="checkbox"/> | drwxr-xr-x 2 | root | root | 0 | Oct | 25 | 2004 | grid | |
| <input checked="" type="checkbox"/> | drwxr-xr-x 1 | root | root | 0 | Dec | 17 | 2005 | castor | |
| <input checked="" type="checkbox"/> | -rw-r--r-- 1 | root | root | 0 | Aug | 13 | 2004 | foo | |

MC generator and Physics Process description slices

MCDB - Monte-Carlo DataBase

New window - Close window - Help

Article creating | New generator | New process | New model | New cut

General information | Event files | Generator | Model | Process | Cuts | Preview/save

GENERATOR: **VERSION:**

[Other generator/version](#)

DESCRIPTION:
Old version of CompHEP with old format of event files (compatible with interface implemented to CMKIN)

HOME PAGE:
<http://theory.sinp.msu.ru/comphep>

MCDB © 2005 Monte-Carlo Generators

MCDB - Monte-Carlo DataBase

New window - Close window - Help

Article creating | New generator | New process | New model | New cut

General information | Event files | Generator | Model | Process | Cuts | Preview/save

PROCESS:
PP -> MU,MU,MU,MU, PDF: CTEQ5L, QCD SCALE: SQRT(S)

[Describe new](#)

- pp -> tT+2Jet, PDF: CTEQ6M, QCD scale: 175
- ANY -> ANY, PDF: ANY, QCD scale: ANY
- pp -> tau,tau,j,j,j, PDF: CTEQ5L, QCD scale: MZ2+pT,Z2
- pp -> W,j,j,j, PDF: CTEQ5M1, QCD scale: MW
- pp -> mu,mu,mu,mu, PDF: CTEQ5L, QCD scale: sqrt(S)**
- pp -> W+ and 3 jets, PDF: CTEQ5M1, QCD scale: M(W-boson)=79.958 GeV, Alpha_s(MZ) = 0.1185
- pp -> mu,mu,j,j, PDF: CTEQ5L, QCD scale: 2*mz
- pp -> tau,tau,j,j,j, PDF: CTEQ5L, QCD scale: MZ2+pT,Z2

--> PDF:

MCDB © 2005 Monte-Carlo Generators group, LCG, CERN Username: Lev Doudko, Permission: moderator Date: Wed Nov 23 20:14:18 2005

MCDB - Monte-Carlo DataBase

Article creating | New generator | New process | New model | New cut

General information | Event files | Generator | Model | Process | Cuts | Preview

MODEL:

SM, Feynman gauge

NAME: SM, Feynman gauge

DESCRIPTION:

PARAMETERS:

| PARAMETER | VALUE | DESCRIPTION |
|-------------|---------|-------------|
| m_s | 0.117 | |
| m_b | 4.85 | |
| GG | 1.21358 | |
| m_t | 1.77699 | |
| S_W | 0.48076 | |
| M_{HIGGS} | 115 | |
| s_{12} | 0.2229 | |
| m_c | 1.65 | |
| M_{top} | 174.3 | |
| EE | 0.31345 | |
| s_{23} | 0.0412 | |
| m_μ | 0.10566 | |
| s_{13} | 0.0036 | |
| M_Z | 91.1876 | |

Physics model
parameters
and applied cuts slices

MCDB - Monte-Carlo DataBase

Article creating | New generator | New process | New model | New cut

Create new set of cuts

< <
Remove

Cut description
OTHER: other object
 Include region Exclude region

HTML:

Add cut

MCDB © 2005 Monte-Carlo Generators group, LCG, CERN Username: Lev Doudko, Permission: moderator Date: Wed

PARAMETERS OF EVENT SAMPLE DESCRIPTION

MCDB XML Scheme inside HepML specifications

- ◆ General information
 - Title
 - Abstract
 - Authors
 - Experiment and/or Group
- ◆ Physics process
 - Initial state
 - Final state
 - QCD scale
 - Process PDF
- ◆ Event files
 - Physics process/subprocesses
 - File name
 - Events number
 - cross section and uncertainty
- ◆ Used generator
 - Name and version
 - Description
 - Home page address
- ◆ Theoretical model
 - Name
 - Description
 - Set of parameters and their values with author's descriptions
- ◆ Applied cuts

MCDB API C++ Classes

<http://mcdb.cern.ch/doc/API/public/mcdb.hpp>

```
namespace mcdb
{
class MCDB;
class Article;
class File;
class Author;
class Cut;
class Generator;
class Model;
class Process;
class Subprocess;
}
```

```
class Generator{
public:
    Generator();
    ~Generator();
    string& name();
    string& name(const string&);
    string& version();
    string& version(const string&);
    string& homepage();
    string& homepage(const string&);
};
```

```
class Process{
public:
    Process();
    ~Process();
    string& initialState();
    string& initialState(const string&);
    string& finalState();
    string& finalState(const string&);
    string& factScale();
    string& factScale(const string&);
    string& renormScale();
    string& renormScale(const string&);
    string& pdf();
    string& pdf(const string&);
};
```

```
class Model{
public:
    Model();
    ~Model();
    class ModelParameter;
    string& name();
    string& name(const string&);
    string& description();
    string& description(const string&);
    vector<ModelParameter>& parameters();
    vector<ModelParameter>&
parameters(const vector<ModelParameter>&)
class ModelParameter
{
public:
    ModelParameter();
    ~ModelParameter();
    string& name();
    string& name(const string&);
    string& value();
    string& value(const string&);
};
};
```

History: CMS MCDB

- <http://cmsdoc.cern.ch/cms/generators/mcdb/>
- Operated in CMS during the OSCAR/ORCA era, widely used by the Higgs group
- Only parton level files; AFS storage; Only phonetic search; No SQL

The screenshot shows a web browser window titled "LCG Monte-Carlo Events DataBase - Mozilla". The page content is as follows:

- Header:** "Monte-Carlo Events Data Base" with a CMS logo on the right.
- Left Sidebar:** A vertical menu with links: HIGGS, TOP, W and n jets, Z and n jets, Gamma and n jets, WW and n jets, ZZ and n jets, WZ and n jets, Gamma Gamma n jets, W Gamma n jets, Z Gamma n jets, QCD multijets, REQUESTS, PROGRAMS, FAQ.
- Main Content Area:** A list of event samples with details:
 - QCD 2TAU+3J EVENTS WITH ALPGEN2. CAN BE USED FOR MLM ME+PS**
QCD 2tau+3j events generated with ALPGEN2 by Maiko Takahashi. Can be used for MLM ME+PS procedure, since generated with iclw=1
published: 06/06/2005 | author: Alexandre Nikitenko | category: Z and n jets
 - QCD 2TAU+2J EVENTS WITH ALPGEN2. CAN BE USED FOR MLM ME+PS**
QCD 2tau+2j events generated with ALPGEN2 by Maiko Takahashi. Can be used for MLM ME+PS procedure, since generated with iclw=1
published: 06/06/2005 | author: Alexandre Nikitenko | category: Z Gamma n jets
 - LO gg->W*W*->2L EVENTS, L=E, MU, TAU**
LO gg->W*W*->2l events provided by Nikolas Kauer for gg->H->WW*->2l study during Les Houches 2005 Workshop. The information about generator can be found on Higgs group page
published: 19/05/2005 | author: Alexandre Nikitenko | category: WW and n jets
 - PHOTON + 3 JETS, QCD DIAGRAMS, COMPLETE TREE LEVEL SETS, COMPHEP, 850K EVENTS**
QCD fake background to the light Higgs signal in the W,Z fusion (gamma gamma + 2 jets channel). 850K event sample generated by CompHEP 4.2p1
published: 25/04/2005 | author: Mikhail Dubinin | category: Gamma and n jets
 - PP->tt* + GAMMA GAMMA, T1(2)->Wb->QQb, T2(1)->Wb->B L NU (L=E,MU,TAU) GENERATED BY MADGRAPH II**
pp->tt* + gamma gamma, t1(2)->Wb->qqb, t2(1)->Wb->bl nu (l=e,mu,tau) generated by Susanne Gascon with MadGraph II; gammas from ISR and FSR from top quarks
published: 25/03/2005 | author: Alexandre Nikitenko | category: TOP
 - EW TAUTAU+JJ WITH MADGRAPH. VBF AND MTAUTAU PRESELECTIONS WERE APPLIED**
- Right Sidebar:** "PUBLISH NEW DOCUMENT:" with options: non authorized author, authorized author, administrators area, and a "HELP" link.
- Bottom Left:** "SEARCH THIS SITE" with a search input field and a "search" button.

Documentation

- ◆ **Main Web Page** <http://mcdb.cern.ch>

- ◆ Description of the project
- ◆ Users and Authors HOW-TOs
- ◆ Developers documentation

- ◆ **Wiki**

<https://twiki.cern.ch/twiki/bin/view/CMS/MCDBCMSInterface>

<https://twiki.cern.ch/twiki/bin/view/LCG/LCGMCDB>

- ◆ [\[hep-ph/0404241\]](#) LCG MCDB proposal
- ◆ [\[hep-ph/0604120\]](#) LCG MCDB report (p.200-204)
- ◆ [\[hep-ph/0703287\]](#) LCG MCDB description
- ◆ **Core software supported by LCG Software Project**

Infrastructure (MySQL; CASTOR; CGI; Perl; Apache)

- ◆ **Mailing lists - USERS:** lcg-mcdb-users@cern.ch
Developers: project-lcg-mcdb@cern.ch

Summary

- ◆ Three MCDB interfaces are ready:
 - Interactive WEB interface (everything is possible)
 - MCDB API is the automatic way to process the event samples from MCDB during the production (not only LHEF samples)
 - Uploading Interface is the automatic way to upload and describe LHEF sample(s) in MCDB (Not only LHEF samples can be uploaded but not described automatically. First version of UCS works with MG header only)
- ◆ LibHepML is the proposed standard way to describe the sample automatically in ME generator (development version is available in MCDB)

MCDB Software

- ◆ Stable versions of MCDB server and MCDB API are available in the download section:
<http://mcdb.cern.ch/distribution>
- ◆ Development versions are in MCDB CVS:
<simu.cvs.cern.ch:/cvs/simu/GENSER/MCDB>
<http://simu.cvs.cern.ch/cgi-bin/simu.cgi/simu/GENSER/MCDB/>
- ◆ Integration of MCDB API in CMSSW CVS is in
<CMSSW/src/GeneratorInterface/MCDBInterface>
- ◆ All of the MCDB software will be published as an OpenSource in HepFourge

Where to Find MCDB Uploading Interface Scripts

Client Part of Uploading Interface: *upload2mcdb.pl*

CVS: <http://simu.cvs.cern.ch/cgi-bin/simu.cgi/simu/GENSER/MCDB/distribution/>

Stable Version: <http://mcdb.cern.ch/distribution/>

Server Part of Uploading Interface: *upload_server.cgi*

CVS: <http://simu.cvs.cern.ch/cgi-bin/simu.cgi/simu/GENSER/MCDB/cgi-bin/authors/>

HepML in LHEF

- ◆ J. Alwall et al., A standard format for Les Houches Event Files (2006) [[hep-ph/0609017](#)] and [[hep-ph/0703287](#)]
- ◆ Event Sample Structure:

```
<LesHouchesEvents version="1.0">  
  <header>  
    <hepml>  
      <!-- HepML sample description here -->  
    </hepml>  
  </header>  
  <init> ... </init>  
  <event> ... </event>  
  <event> ... </event>  
  .....  
</LesHouchesEvents>
```