

PhenoData

Database for pheno analyses and recasting

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<https://hepmdb.soton.ac.uk/phenodata/>

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HEPMDB

High Energy Physics Model Data Base

(Re)interpreting the results of new physics searches at
the LHC

15th May 2018

Motivation

2nd (Re)interpreting the results of new physics searches at the LHC, Dec 2016:

To centrally and effectively store data (digitized curves from figures, tables etc) from those HEP papers which do not provide data in HEPData or elsewhere, in order to avoid duplication of work of HEP researchers on digitizing plots.

In progress:

Addition of signatures and recast public code availability, alongside search filters to enable navigation of this information

Goals

- Flexible data structures, for multi-purpose data attachments:

- Document-orientated database
MongoDB allows for arbitrary data structures



mongoDB®

- May store “jagged” JSON like data – very flexible!

- User-friendly interface, including search/filters

- Secure storage and API for batch queries

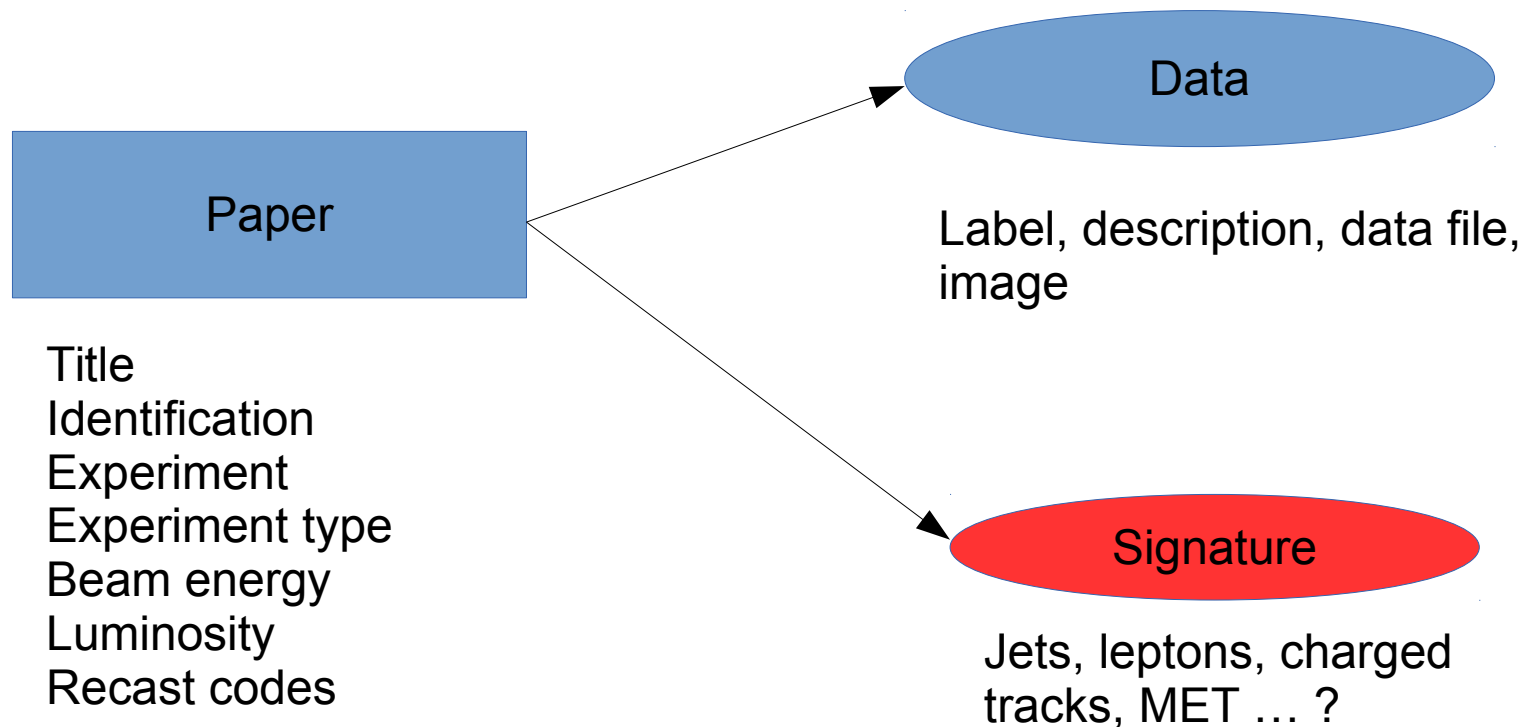
- Lumen provides fast, secure PHP micro-framework for APIs



Lumen

Schema


- Listings are created for a paper, and data uploads are attached to this.



SCHEMA NOT COMPLETE

Site structure

- Currently 79 papers listed
- Unregistered users may view/download data, must register to upload.

 Add PhenoData record for paper »

Previous **1** 2 3 4 5 6 7 8 Next

Showing 0-10 of 79

Search for resonant $t\bar{t}$ production in proton-proton collisions at $\sqrt{s} = 8\text{TeV}$ 1

arXiv: 1506.03062
preprint: CMS-B2G-13-008, CERN-PH-EP-2015-126
inspirehep: 1375314

Attachments:  Signatures: 

14-05-2018



Search for an additional, heavy Higgs boson in the $H \rightarrow ZZ$ decay channel at $\sqrt{s} = 8\text{ TeV}$ in pp collision data with the ATLAS detector 2

Journal: Eur.Phys.J.C (2016) 76 : 45
arXiv: 1507.05930
DOI: 10.1140/epjc/s10052-015-3820-z
preprint: CERN-PH-EP-2015-154
inspirehep: 1384120

Attachments:  Signatures: 

13-05-2018



Search for a high-mass Higgs boson decaying to a WW boson pair in pp collisions at $\sqrt{s} = 8\text{ TeV}$ with the ATLAS detector 3

Journal: JHEP 1601 (2016) 032
preprint: CERN-PH-EP-2015-185

Uploading

The screenshot shows the PhenoData interface. A modal dialog box titled "Enter INSPIRE ID:" is centered on the screen. It contains a text input field with the value "1469069" and a blue "Upload" button. Below the input field is a "Skip" button. The background is dimmed, showing a list of papers. The first paper is titled "Search for an additional, heavy detector" with journal information: "Journal: Eur.Phys.J.C (2016) 76: 45", "arXiv: 1507.05930", "DOI: 10.1140/epjc/s10052-015-3820-z", "preprint: CERN-PH-EP-2015-154", and "inspirehep: 1384120". The date "13-05-2018" is shown below. The second paper is titled "Search for a high-mass Higgs boson decaying to a WW boson pair in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector" with journal information: "Journal: JHEP 1601 (2016) 032", "preprint: CERN-PH-EP-2015-185", and "arXiv: arXiv:1509.00389".

- Upload → enter Inspire HEP ID, will autofill some fields from bibtex

Paper Title*: (inline LaTeX supported)

Search for top squarks in final states with one isolated lepton, jets, and missing transverse momentum in $\sqrt{s}=13$ TeV pp collisions with the ATLAS

Make private:

Hide paper from public?

Make private

References:

Enter arXiv links and other identifiers in these fields

inspirehep	1469069
arXiv	1606.03903
preprint	CERN-EP-2016-113

+ New Reference

Experiment*:

Choose experiment from dropdown or alternatively add new to database by selecting 'Other' and providing information.

ATLAS

Beam energy [TeV]:

Luminosity [fb^{-1}]:

Public code:

CheckMATE

GAMBIT

MadAnalysis5 PAD

Rivet

SModelS

- Inline TeX supported
- Can keep private – for preparing data release alongside paper
- Many reference types
- If experiment not listed, choose 'other' to add new experiment to db table along with 'type'
- Public code availability, soon to include optional 'user upload' feature

Paper view

PhenoData Papers Contact Cite Us

Search for paper... Daniel Locke

Combination of searches for WW , WZ , and ZZ resonances in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector

arXiv: 1512.05099
inspirehep: 1409918

PhenoData record added by Kimiko Yamashita

07-04-2017 17:30

Add data »

- Edit your own uploads
- May contact uploaders directly or post public comments

- Each attachment must have at least label and data
- May also upload an image (.pdf preferred-converted to .png and stored alongside original)

Add data »

Add new Paper Data*

Upload both table and figure data for your paper here

Label*:
eg: 1.1a

Data*:
Any textual format
Browse... No file selected.

Figure image:
Optional image to display
Browse... No file selected.

Data description here

Upload

ATLAS $\sqrt{s} = 8$ TeV $L dt = 20.3 \text{ fb}^{-1}$

$\sigma(pp \rightarrow G^*) \times BR(G^* \rightarrow WW)$ [pb]

Bulk RS graviton $k/M_{Pl} = 1$, Leading Order

Expected Upper Limit

Observed Upper Limit

$\pm 1 \sigma$

$\pm 2 \sigma$

Channels Combined: $l\nu qq + JJ$

ATLAS $\sqrt{s} = 8$ TeV $L dt = 20.3 \text{ fb}^{-1}$

$\sigma(pp \rightarrow G^*) \times BR(G^* \rightarrow ZZ)$ [pb]

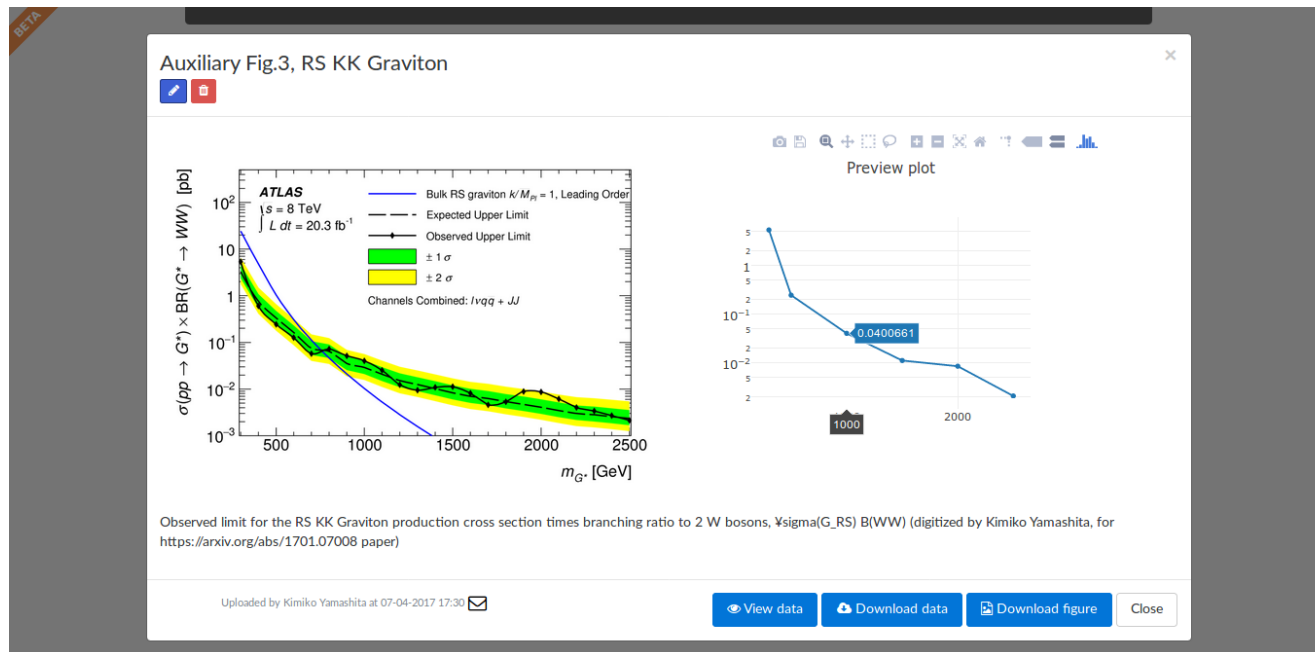
Bulk RS graviton $k/M_{Pl} = 1$, Leading Order

Expected Upper Limit

Observed Upper Limit

$\pm 1 \sigma$

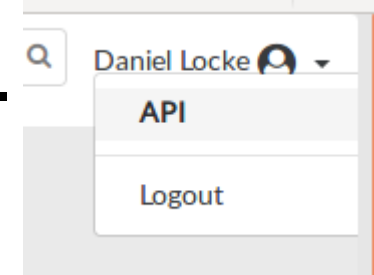
Attachment view



- Uploaded image displayed side-by-side with interactive plot (using plot.ly) generated from data – not so clever at this point, only parses 2 column data

API

- RESTful API created to enable batch upload/download of data using simple shell script.
- AUTH_KEY can be found under API tab.
- Help page and examples also under API



```
curl "http://hepmdb.soton.ac.uk/phenodata/api/public/upload" \  
-X POST \  
-F "auth_token=AUTH_KEY" \  
-F "id=5878e24ebb81757d03e05a2e" \  
-F "label=Fig 1.1b" \  
-F "description=Test API Upload" \  
-F "upload=@/path/to/data/data.dat" \  
-F "figure=@/path/to/data/figure.jpg"
```

The above command returns JSON structured like this:

```
{  
  "id": "5878e24ebb81757d03e05a2e",  
  "success": true  
}
```

- Attach data to paper using id **or** BibTeX-formatted URL to grab the paper data – will create paper record if does not exist and return in the response

API

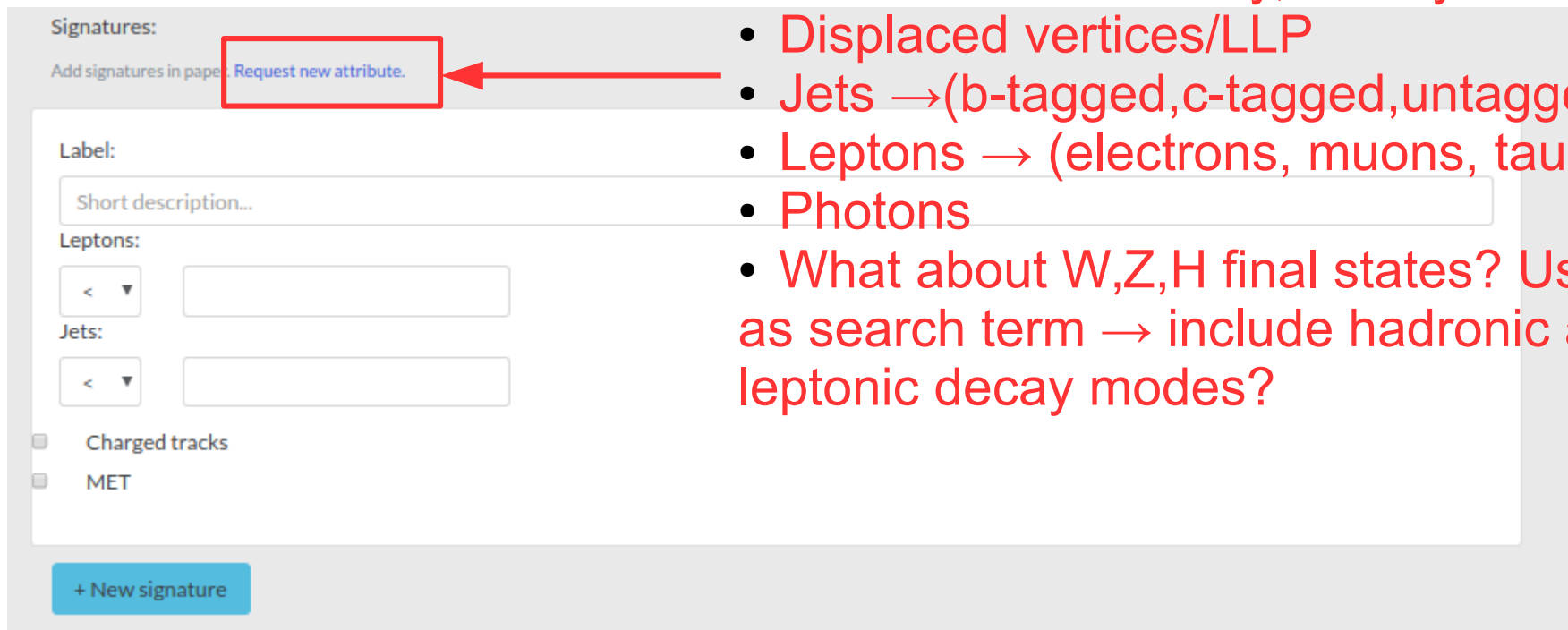
- We provide bash script to upload from tabulated data, e.g

#Paper	#Label	#Comment	#DataFile	#Figure
"https://inspirehep.net/record/1507303/export/hx"	"Fig. 1b"	"This is the example for API"	"x.dat"	"x.jpg"
"https://inspirehep.net/record/1507303/export/hx"	"Fig. 1b"	"This is the example for API"	"x.dat"	"x.jpg"
"https://inspirehep.net/record/1507303/export/hx"	"Fig. 1b"	"This is the example for API"	"x.dat"	"x.jpg"

- Will not create duplicates in database – useful for public recast code developers or anyone with large amount of digitized data
- Signatures not yet included in queries – will be added soon

Signatures

- Signature definitions important here and should be standardised, current placeholder:



Signatures:

Add signatures in paper: [Request new attribute.](#)

Label:

Short description...

Leptons:

< ▾

Jets:

< ▾

Charged tracks

MET

+ New signature

- Resonances? 2-body, 3 body?
- Displaced vertices/LLP
- Jets → (b-tagged, c-tagged, untagged)
- Leptons → (electrons, muons, taus)
- Photons
- What about W,Z,H final states? Use as search term → include hadronic and leptonic decay modes?

Search

- Quick search simply searches all fields for expression
- Advanced search allows filtering of results

The screenshot displays the PhenoData search interface with the following components:

- Paper Title:** (inline LaTeX supported) - Input field
- Experiment:** - Dropdown menu
- Experiment type:** - Dropdown menu
- Beam energy [TeV]:** - Input field
- Luminosity [fb⁻¹]:** - Input field
- Public code available:** - List of checkboxes:
 - OR logic
 - CheckMATE
 - GAMBIT
 - MadAnalysis5 PAD
 - Rivet
 - SModelS
 - User supplied
- References:** - Section header
- Enter arXiv links and other identifiers in these fields:** - Instruction text
- inspirehep** - Dropdown menu
- Signatures:** - Section header
- Add signatures for topologies in paper:** - Instruction text
- Label:** - Input field with placeholder "Short description..."
- Leptons:** - Dropdown menu and input field
- Jets:** - Dropdown menu and input field
- Charged tracks
- MET
- Search** - Blue button at the bottom

Future Developments

- Finalise signature schema
- We encourage recast developers to populate database and keep up-to-date and will develop web-tools to help maintain
- Add “usergroups“ for public recast code developers with additional permissions manage their list of analyses
- Add new db table for user supplied recast codes alongside metadata e.g paper ref, validation materials
- Link HEPMDB and PhenoData via signatures

We welcome suggestions for new features, or data structures to make recasting information easier to navigate.

Thanks