HepData Present and Future

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HepData advisory board kickoff meeting
IPPP Durham, 12th November 2014

- Evolution of data submission procedure
- Other recent/future developments

http://hepdata.cedar.ac.uk

Data “input” format

```
*dataset:
*location: Page 20 of preprint
*dscomment: The measured total cross sections.
The first systematic uncertainty is the combined
systematic uncertainty excluding luminosity, the
second is the luminosity
*reackey: P P --> Z0 Z0 X
*obskey: SIG
*qual: RE : P P --> Z0 Z0 X
*yheader: SIG(total) IN FB
*xheader: SQRT(S) IN GEV
*data: x : y
 7000; 6.7 +- 0.7 (DSYS=+0.4,-0.3,DSYS=0.3:lumi);
*dataend:
```

http://hepdata.cedar.ac.uk/view/ins1203852/d2/input

Table 2 (Page 20 of preprint.) HIDE DATA or as: input, plain text, AIDA, PyROOT, YODA, ROOT, mpl, ScaVis or MarcXML

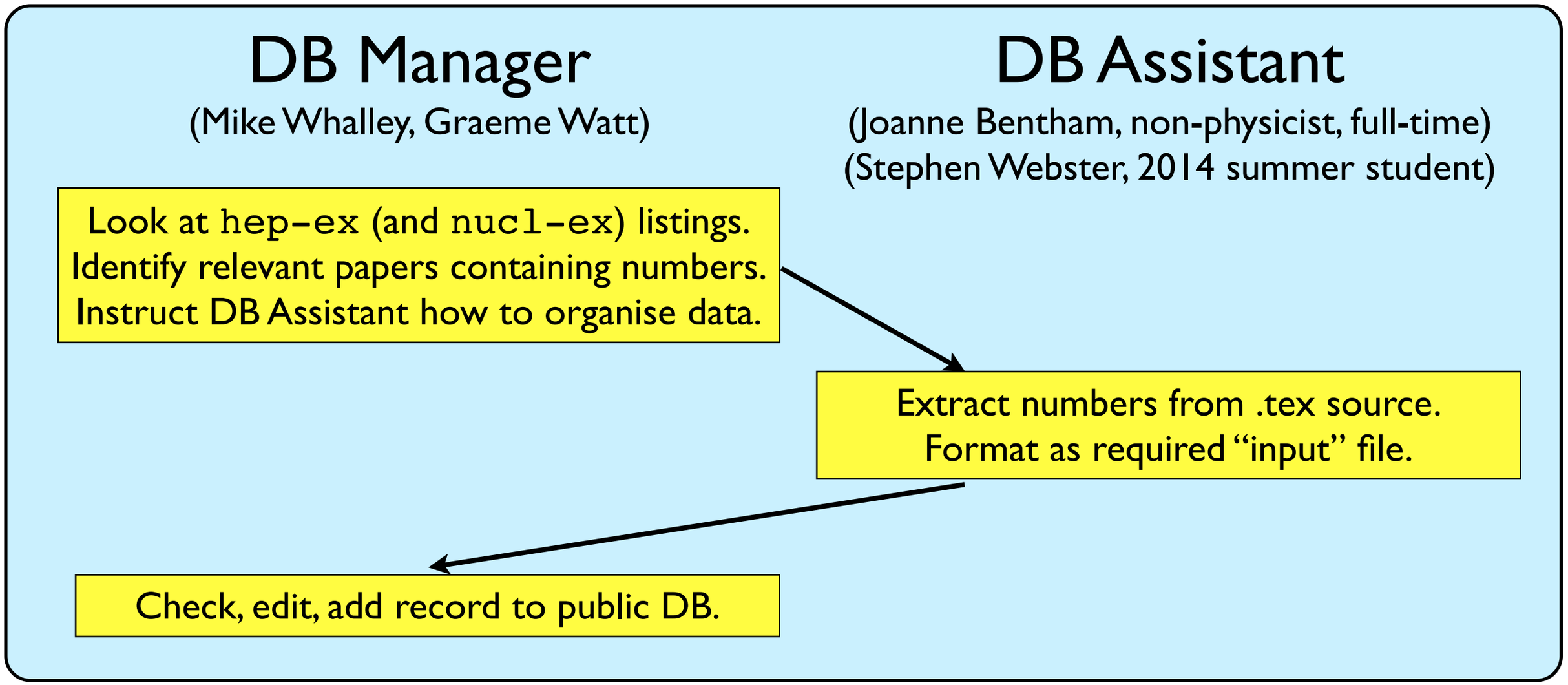
The measured total cross sections. The first systematic uncertainty is the combined systematic uncertainty excluding luminosity, the second is the luminosity.

RE	P P –> Z0 Z0 X
SQRT(S) IN GEV	SIG(total) IN FB
7000.	6.7 ± 0.7 (stat) +0.4,-0.3 (sys) ± 0.3 (sys,lumi)

Plot
SelectPlot

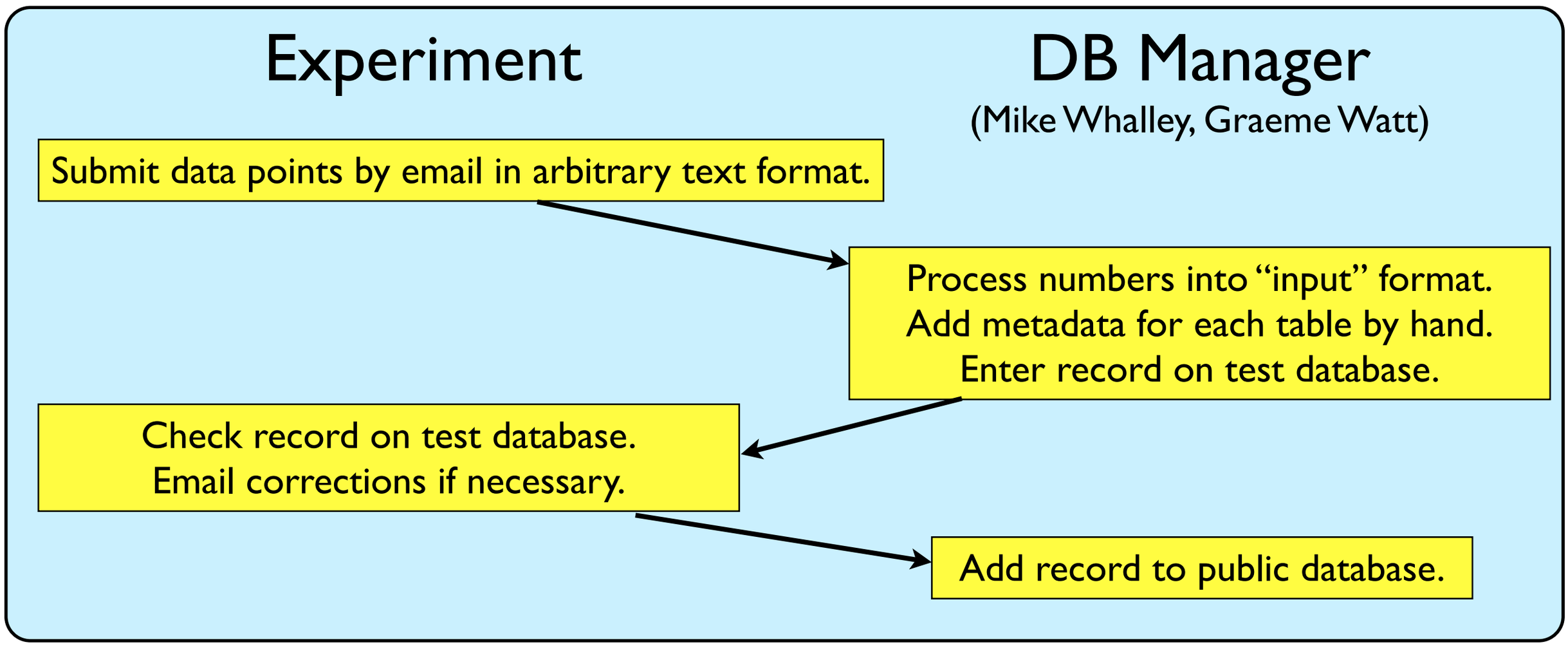
- All data needs to be transformed into a standard “input” text format.
- Metadata for each table followed by data points in a structured format.
- `*reackey` and `*obskey` keywords can be used for searching database.

Data extraction from arXiv source



- DB Manager can also perform entire tedious procedure.
- Only small fraction of papers can be manually processed.
- Most papers do not contain numerical values of data points.

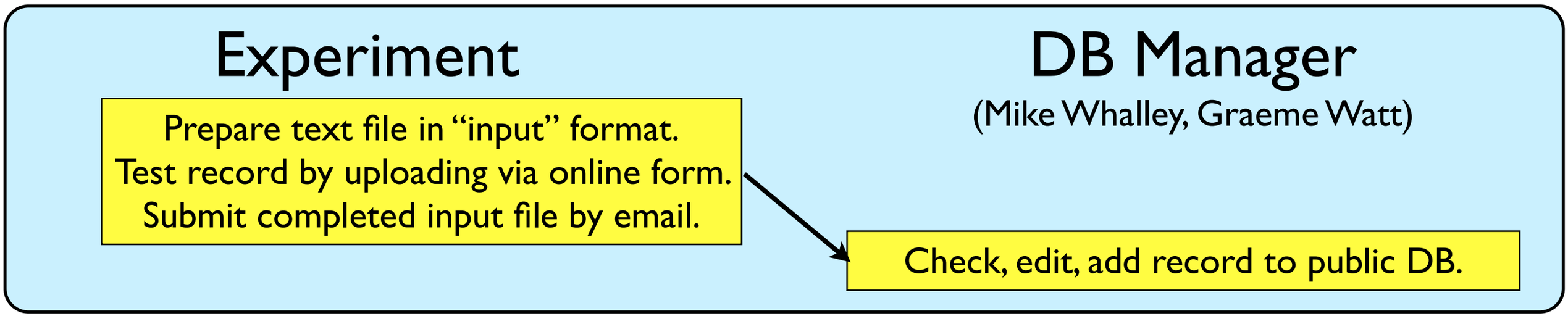
Manual processing of submitted text files



- Processing each paper often took hours/days if many tables.
- Tedious, error-prone and unnecessary procedure.
- Experiments were unaware of existence of "input" format.

Direct submission in "input" format

- Earlier this year we started to encourage use of "input" format.
- Links were added to export each table to the "input" format.
- An annotated sample input file was also provided.
- More comprehensive documentation of format still needed.



- Almost all submissions in "input" format within a few months.
- Third-party tools developed using "input" format:
  - Script by Mike Flowerdew (ATLAS) to convert objects in ROOT files to "input" format.
  - ROOT class by Christian Holm Christensen (ALICE) to extend TGraph to support data points with multiple errors, that can export to and import from HepData "input" format.

Automated submission system

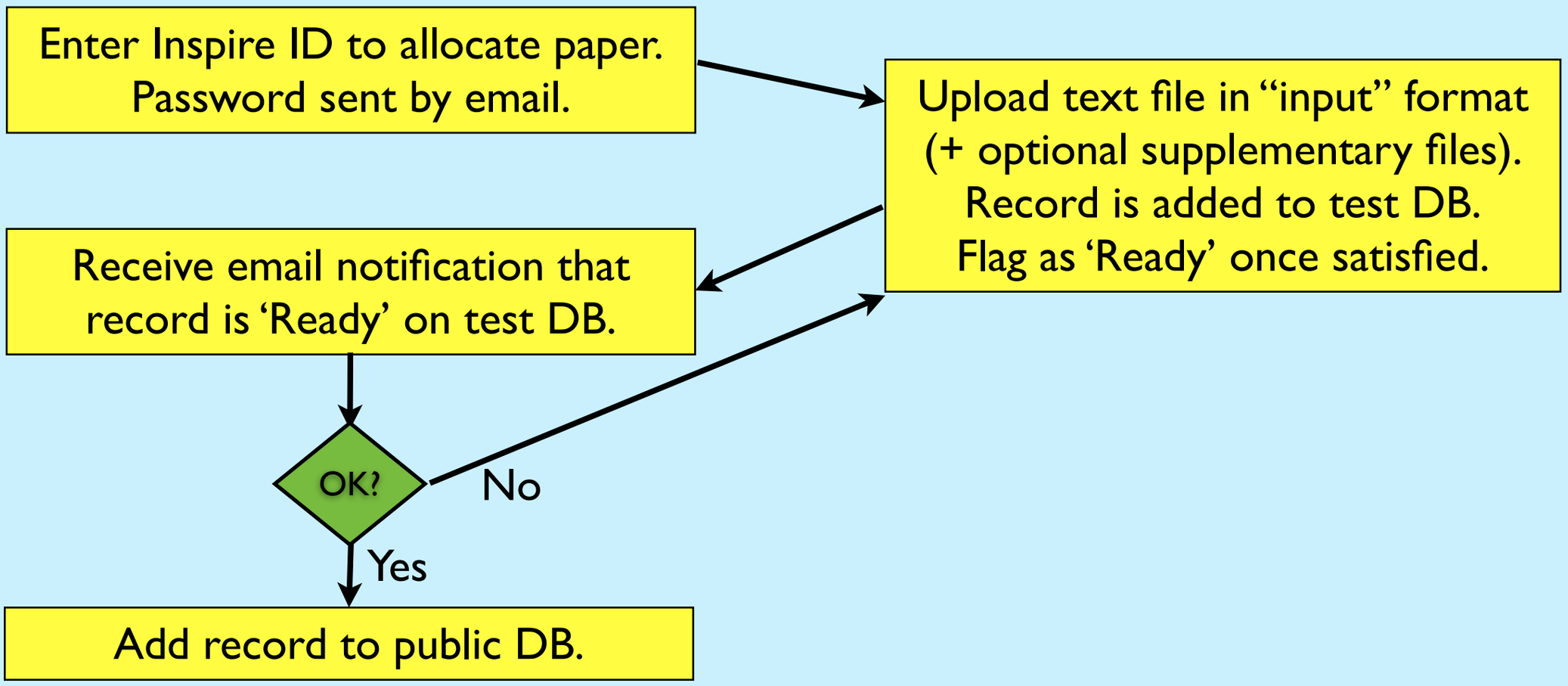
(Procedure agreed in HepData meeting at CERN on 26th June 2014)

Administrator

(e.g. convener of physics group)
http://hepdata.cedar.ac.uk/manage

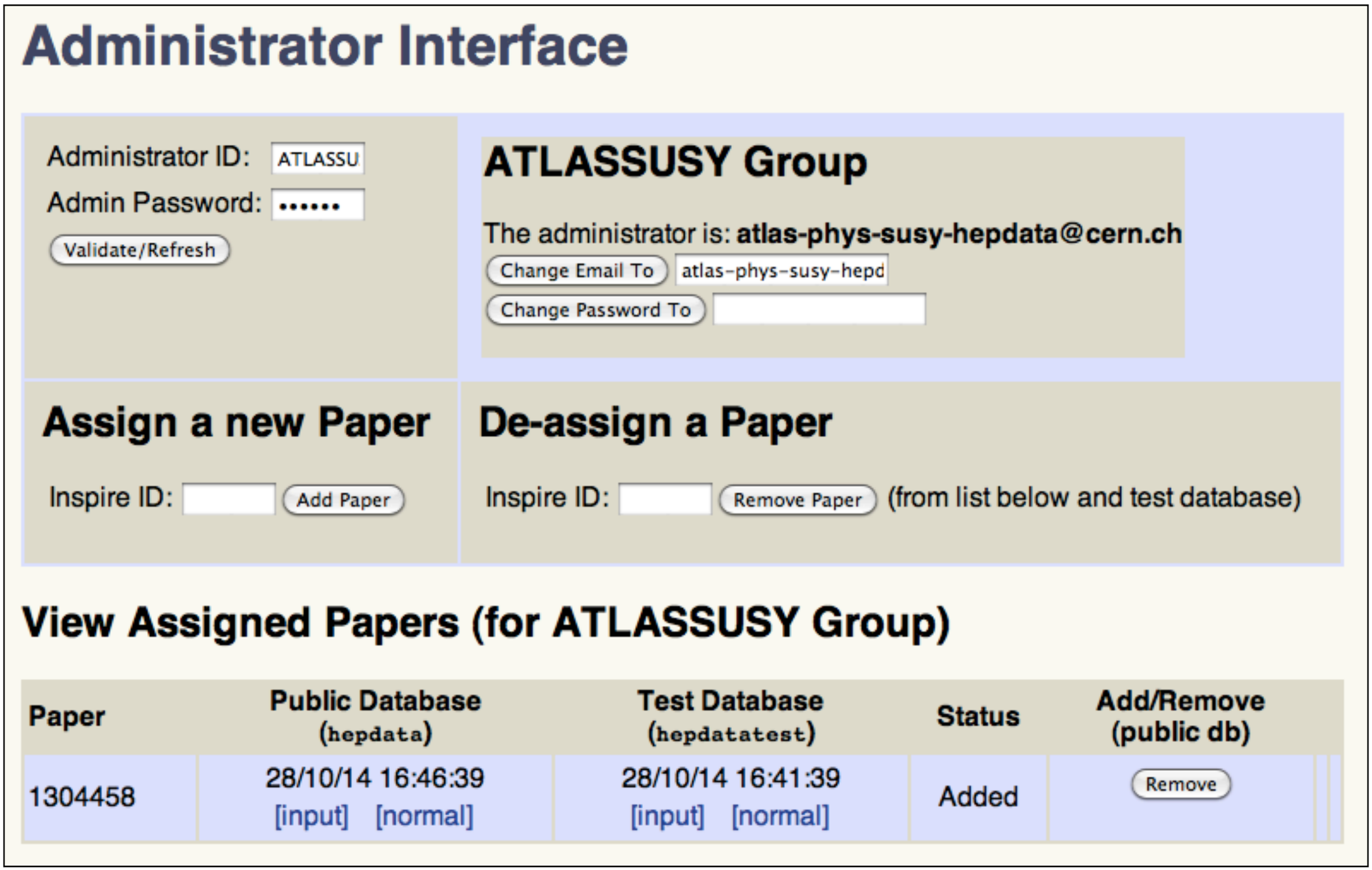
Encoder

(e.g. primary author of physics analysis)
http://hepdata.cedar.ac.uk/input



- System launched two weeks ago. Active Administrators so far: **ATLAS** (EXOT, STDM, SUSY), **CMS** (B2G, SMP), **LHCb** [Future: **ALICE**]

http://hepdata.cedar.ac.uk/manage



- First paper added by ATLAS SUSY group: http://hepdata.cedar.ac.uk/view/ins1304458

http://hepdata.cedar.ac.uk/input

- Encoder can upload up to four supplementary files of any format.

http://hepdata.cedar.ac.uk/view/ins1304458

AAD 2014 — Search for supersymmetry in events with large missing transverse momentum, jets, and at least one tau lepton in 20 fb^-1 of sqrt(s)=8 TeV proton-proton collision data with the ATLAS detector

Experiment: CERN-LHC-ATLAS (ATLAS)
Published in **JHEP 1409,103 (2014)** (DOI:10.1007/JHEP09(2014)103)
Preprinted as **CERN-PH-EP-2014-144**
Archived as: **ARXIV:1407.0603**
Auxiliary Material: http://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/PAPERS/SUSY-2013-10/
Record in: **INSPIRE**
Record in: **CERN Document Server**

CERN-LHC. A search for supersymmetry (SUSY) in events with large missing transverse momentum, jets, at least one hadronically decaying tau lepton and zero or one additional light leptons (electron/muon), has been performed using 20.3 fb^-1 of proton-proton collision data at sqrt(s)=8 TeV recorded with the ATLAS detector at the Large Hadron Collider. No excess above the Standard Model background expectation is observed in the various signal regions and 95% confidence level upper limits on the visible cross section for new phenomena are set. The results of the analysis are interpreted in several SUSY scenarios, significantly extending previous limits obtained in the same final states. In the framework of minimal gauge-mediated SUSY breaking models, values of the SUSY breaking scale Lambda below 63 TeV are excluded, independently of tan(beta). Exclusion limits are also derived for an mSUGRA/CMSSM model, in both the R-parity-conserving and R-parity-violating case. A further interpretation is presented in a framework of natural gauge mediation, in which the gluino is assumed to be the only light coloured sparticle and gluino masses below 1090 GeV are excluded.

slha file for one example point from the bRPV grid. Grid parameters are m_0=600 GeV and m_1/2=600 GeV.
slha file for one example point from the nGM grid. Grid parameters are m_gluino=940 GeV and m_stau=210 GeV.
slha file for one example point from the GMSB grid. Grid parameters are Lambda=60 TeV and tan(beta)=30.
slha file for one example point from the mSugra grid. Grid parameters are m_0=800 GeV and m_1/2=400 GeV.

Total number of tables: **113**. Displaying: **1** to **10**. First | Previous | Next | Last | All

- Links to supplementary files appear below the abstract.

@HepData on Twitter

- Twitter feed launched almost one year ago.
- Widget with Twitter feed embedded on homepage.
- Now sent ~200 tweets with over 100 followers.

Pinned Tweet

HepData @HepData · Nov 21

This Twitter feed will announce new records added and other updates to the HepData database for High Energy Physics data.

3 2

HepData @HepData · Nov 6

Added @LHCbPhysics data on "Measurement of the cross-section for Z --> e+ e- production in pp collisions at 7 TeV" to hepdata.cedar.ac.uk/view/ins1208102

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Frank Close @closefrank · Feb 14

Anyone interested in particle physics data (tech) #ff @HepData for updates and state of the art.

1 2

Kyle Cranmer @KyleCranmer · 4 hrs

Waking up at 2AM for @HepData advisory board meeting

Juan Rojo @JuanRojoC · Dec 14

Just discovered that @HepData has a twitter feed - very useful to get updates when new data becomes available!

LaTeX support via MathJax

```
*dataset:
*location: Fig 3
*dscomment: Transverse $\langle \sum p_T^\text{ch} / \delta\eta\,\delta\phi \rangle$ vs. $p_T^\text{lead}$ in $|\eta| < 2.5$ in incl jet / excl dijet events
*reackey: P P --> JET X
*reackey: P P --> JET JET X
*qual: PT(LEAD) IN GEV : > 20
*qual: RE : P P --> JET X : P P --> JET JET X
*qual: Region : Transverse
*qual: SQRT(S) IN GEV : 7000.0
*qual: Selection : Inclusive jet : Exclusive dijet
*yheader: $\langle \sum p_T^\text{ch} / \delta\eta \delta\phi \rangle$ (GeV)
*xheader: $p_T^\text{lead}$ (GeV)
*data: x : y : y
 20.0 TO 30.0; 1.184 +- 0.002133 (DSYS=+0.05209,-0.04949); 1.156 +- 0.007098 (DSYS=+0.1071,-0.1025);
```

Table 1 (Fig 3.) HIDE DATA or as: input, plain text, AIDA, PyROOT, YODA, ROOT, mpl, ScaVis or MarcXML

Transverse $\langle \sum p_T^\text{ch} / \delta\eta\,\delta\phi \rangle$ vs. p_T^lead in $|\eta| < 2.5$ in incl jet / excl dijet events.

PT(LEAD)	> 20 GeV	
RE	P P –> JET X	P P –> JET JET X
Region	Transverse	
SQRT(S)	7000.0 GeV	
Selection	Inclusive jet	Exclusive dijet
p_T^lead (GeV)	$\langle \sum p_T^\text{ch} / \delta\eta\delta\phi \rangle$ (GeV)	
20.00 – 30.00	1.184 ± 0.002 (stat) +0.052,-0.049 (sys)	1.156 ± 0.007 (stat) +0.107,-0.102 (sys)

http://hepdata.cedar.ac.uk/view/ins1298811/d1

Possible future developments

- Experiments can now **upload their own data**. Need to encourage greater use, including upload of older data.
- **Data format** is already flexible with any number of *x* and *y* axes in a table. But could provide better support for correlation matrices, 3-D plots, exclusion contours, etc.
- Also want better integration of **auxiliary files** in DB.
- Strengthen links with **Rivet** (`http://rivet.hepforge.org`).
  (**Rivet** allows event generators to reproduce details of an experimental analysis.)
- Improve **searchability** by revamping search indices.
- **Public API** to allow interface to HepData in user code?
- Greater integration with **Inspire**, possibly by using **Invenio** framework to display HepData records.