Annual Meeting, 2018
(DHEP, TIFR)

Ravindra K. Verma

8th May 2018

Content

- **Physics Analysis**
  - Search for Charged Higgs Boson, Decaying into c sbar at $\sqrt{s}$ =13 TeV, In Lepton +Jets Channel with 2016 Data
    - The Analysis Note is at pre-approval stage http://cms.cern.ch/iCMS/jsp/openfile.jsp?tp=draft&files=AN2018_061_v3.pdf

- **Service Task**
  - Tag validation: workflow submission and management in the AlCaDB subgroup
    - Submitted 687 workflows in 2017 and 126 workflows in 2018.
    - Got 4 months EPR credit
  - Upgradation of Fill info O2O (online to offline) package
    - Modified package has been officially merged in the CMSSW_10_X_Y
    - Got 2 months EPR credit
  - Online DCS Shifts at P5 CERN
    - 20 shifts worth 1.58 months EPR credit.

Search for Charged Higgs Boson, Decaying into c sbar at $\sqrt{s}$ =13 TeV, In Lepton +Jets Channel with 2016 Data

Shashi Dugad[1] , Gouranga Kole[3] , Gagan Mohanty[1] , Arun Nayak[4] and Ravindra K. Verma[1]

[1]TIFR Mumbai, [3]UC San Diego, [4]IOP Bhubaneswar

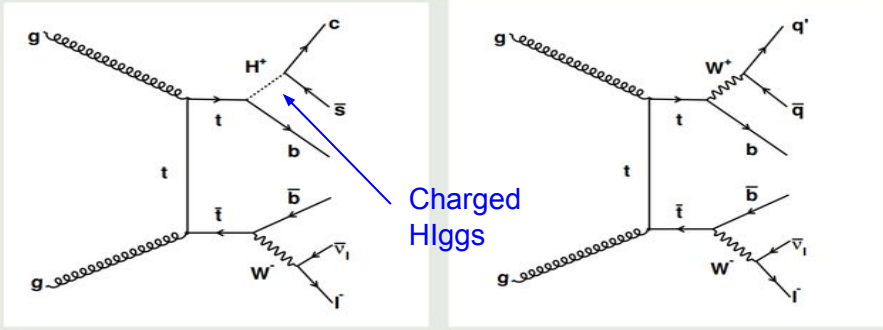
Overview

Content

- Selection Cuts,
- MC Correction, Kinematic Fitting,
- Systematics,
- Data, MC Comparison,
- Exclusion limit on BR (t-> H^+ b),
- Optimization of limit using different methods,
- Conclusion.

Signal event topology : 4-jet, 1-lepton + MET
SM bkg($t\bar{t}$+ jets, single top, W+jets, VV, QCD)

H^+(signal) $t\bar{t}$ (dominant bkg)



Available on the CMS information server **CMS AN-18-061**

CMS Draft Analysis Note

The content of this note is intended for CMS internal use and distribution only

2018/05/04
Head Id:
Archive Id: 457623M
Archive Date: 2018/04/06
Archive Tag: trunk

The AN is at pre-approval stage

Search for a light charged Higgs Boson in the $H^{\pm} \to c\bar{s}(\bar{c}s)$ channel with lepton+jets final states at 13 TeV, in the CMS experiment

S.R. Dugad[1], G. Kole[3], G.B. Mohanty[1], A. Nayak[2], and R.K. Verma[1]

[1] Tata Institute of Fundamental Research, Mumbai, India
[2] Institute of Physics, Bhubaneswar, India
[3] University of California San Diego, USA

Abstract

CMS experiment in 2016 has recorded pp collision events at center of mass energy, $\sqrt{s} = 13$ TeV with an integrated luminosity of 35.9 fb^{-1}. Large number of events due to $t\bar{t}$ production are observed in this data. Under minimal supersymmetric standard model (MSSM) one of the top quark can decay into charged Higgs and b-quark and other top quark in W Boson and b-quark. Charged Higgs boson is assumed to decay into cs ($H^{\pm} \to c\bar{s}(\bar{c}s)$) with branching ratio ($\mathcal{BR}$) of 100%. The W Boson is expected to decay leptonically ($W^+ \to l^+\nu$). Events satisfying topology of a single electron (or muon), at least 2 bjets, 2 non-bjet, and missing energy are selected for this search of charged Higgs. In absence of signal, the upper limit on the $\mathcal{BR}$ of top-quark decaying to charged Higgs and b-quark, as a function of charged Higgs mass, is obtained using 2016 data. Results are presented in this note.

Trigger and Selection Cuts

Cuts on reco muons:

- HLT_IsoMu24
- Pt > 25 GeV, |η| < 2.1, dz < 0.5cm,
- Relative Isolation of muon < 0.15, D0 < 0.2cm,
- Medium muon ID https://twiki.cern.ch/twiki/bin/view/CMS/SWGuideMuonIdRun2
- Number of muons == 1,
- **loose muon veto, no electron**

Cuts on reco electrons:

- HLT_Ele27_WPTight_Gsf
- Pt > 30 GeV, |η| < 2.5, dz < 0.5cm,
- Relative Isolation of electron < 0.08, D0 < 0.2cm,
- Medium Electron ID https://twiki.cern.ch/twiki/bin/viewauth/CMS/CutBasedElectronIdentificationRun2#Working_points_for_2016_data_for
- Number of electrons == 1,
- **loose electron veto, no muon**

Cuts on reco jets, MET:

- MET > 20 GeV. Pt of jets > 25 GeV, |η| < 2.4,
- neutralHadEnFrac < 0.99, neutralEmEnFrac < 0.99, chargedHadEnFrac > 0
- 2 b-tag jets with medium working point (WP)>0.8484. Charm tag with Loose, Medium, Tight WP applied.

Cuts on kinematic fitted events:

- Make sure that the Kinfit converges,
- Same lepton cuts on KF leptons as that of Reco leptons, DeltaR(reco lepton, KF lepton) < 0.2,
- Pt of KF jets > 25 GeV, |η| < 2.4, DeltaR(reco jets, KF jets) < 0.2,Chi^2 of fit > 0, probOfKinFit > 0.

Scale Factors, Energy Corrections, Kinematic Fitting

Muon scale factors:

- Isolation, Identification,
- Tracking, Trigger,
- **Rochester corrections.**

Electron scale factors:

- Reconstruction,
- Identification,
- Trigger.

MC Scale factors:

- Lumi scale factors,
- Pileup reweighting,
- Top Pt reweighting,
- BTag scale factors,
- Jet energy corrections,
  - JES,
  - JER.
- MET corrections,
  - Type -1
- Charm mistag scale factors.

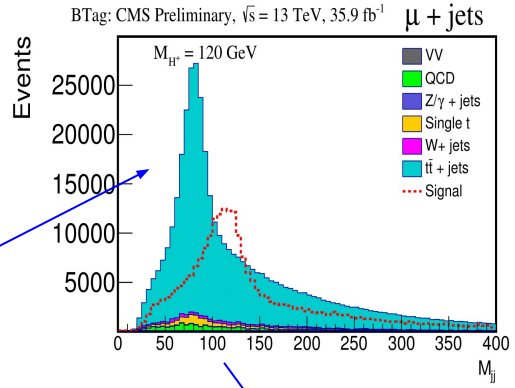
Kinematic Fitting:

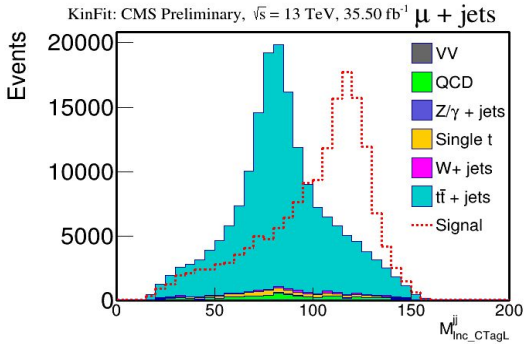
Inputs:

- Reco objects (muons, electrons, jets, MET),
- Constraints on top quark mass (172.5 GeV),
- Semi-leptonic kin fit, b-tagging with medium WP (> 0.8484).

Outputs:

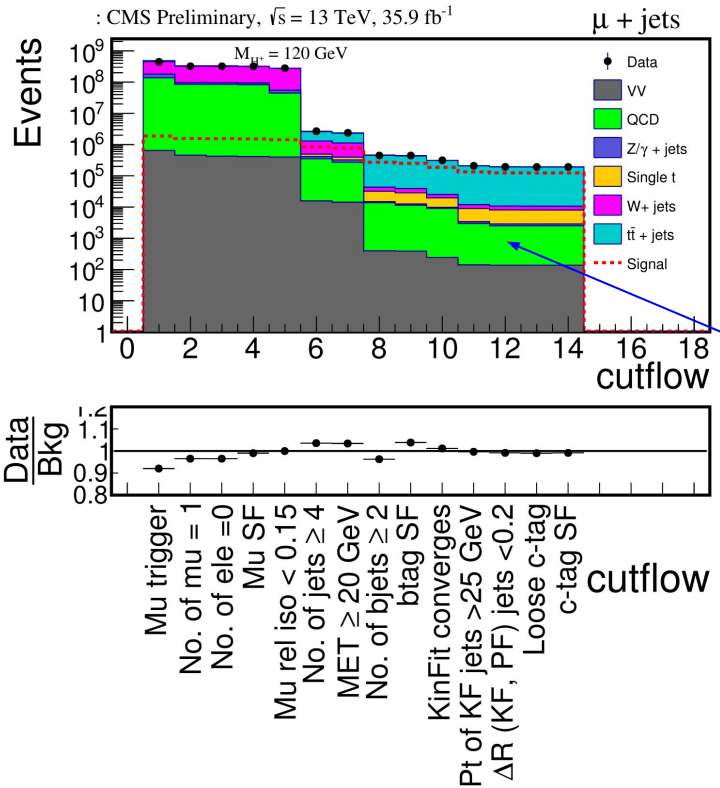
- KF Objects with improved 4-vector,
- Chi square, probability, status



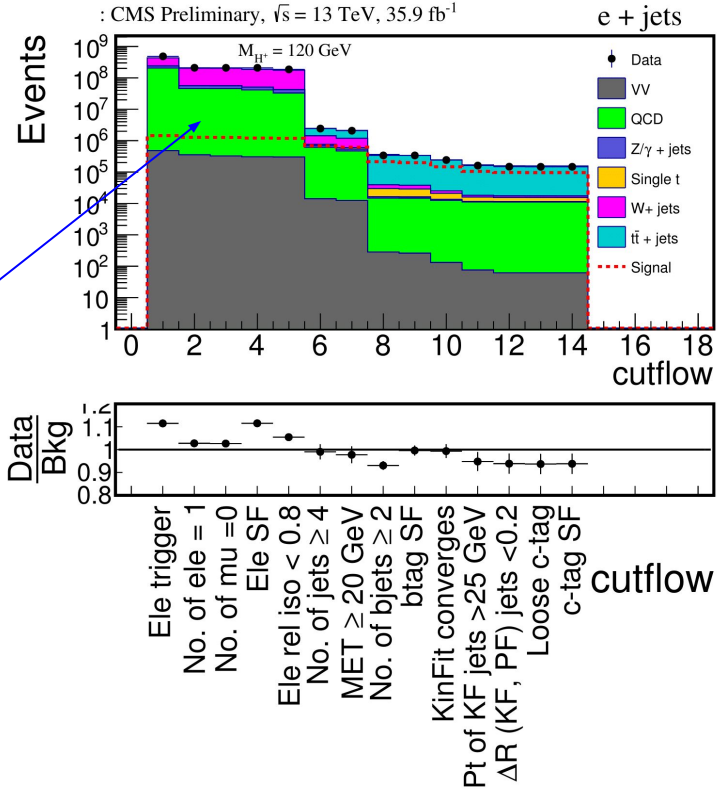


Better dijet-mass resolution

Event Yield after Various Selection Cuts



The QCD events are from MC. Later, we estimate QCD from data.



Muon+jets channel

Electron+jets channel

Systematics : Summary after KinFit

Source	N_{events} ± MC stat ± JEC/MET/Top ± bTag ± cTag ± Pileup
HW, $M_H = 80\ GeV/c^2$	122620.0 ± 916.4 ± 8566.4 ± 4283.9 ± 1972.2 ± 853.9
HW, $M_H = 90\ GeV/c^2$	124569.0 ± 917.9 ± 8012.5 ± 4418.3 ± 2452.1 ± 1428.6
HW, $M_H = 100\ GeV/c^2$	128504.0 ± 928.9 ± 9783.1± 4293.0 ± 1738.1 ± 1217.1
HW, $M_H = 120\ GeV/c^2$	123808.0 ± 912.3 ± 8952.2± 3955.2 ± 1271.4 ± 679.8
HW, $M_H = 140\ GeV/c^2$	97545.2 ± 811.7 ± 8116.2 ± 3384.7 ± 1478.3 ± 897.2
HW, $M_H = 150\ GeV/c^2$	69345.2 ± 681.8 ± 7179.0 ± 2726.4 ± 820.3 ± 776.4
HW, $M_H = 155\ GeV/c^2$	54929.2 ± 617.7 ± 5348.3 ± 2220.5 ± 515.6 ± 346.6
HW, $M_H = 160\ GeV/c^2$	41509.4 ± 525.0 ± 5114.0 ± 1716.6 ± 918.7 ± 242.9
SM $t\bar{t}$	183173.0 ± 272.8 ± 13524.7 ± 5749.4 ± 2972.9 ± 1453.1
W+ jets	2592.4 ± 114.9 ± 516.8 ± 198.1 ± 90.8 ± 81.2
Z/γ+ jets	358.7 ± 15.7 ± 62.4 ± 39.9 ± 19.5 ± 17.0
QCD	3890.0 ± 175.0
Single t	5120.7 ± 41.2 ± 526.1 ± 195.5 ± 92.4 ± 34.0
VV	138.1 ± 20.2 ± 40.6 ± 10.9 ± 13.0 ± 21.0
Total Bkg	195272.8 ± 347.0 ± 13544.9 ± 5756.2 ± 2975.8±1456.0
Data	191971

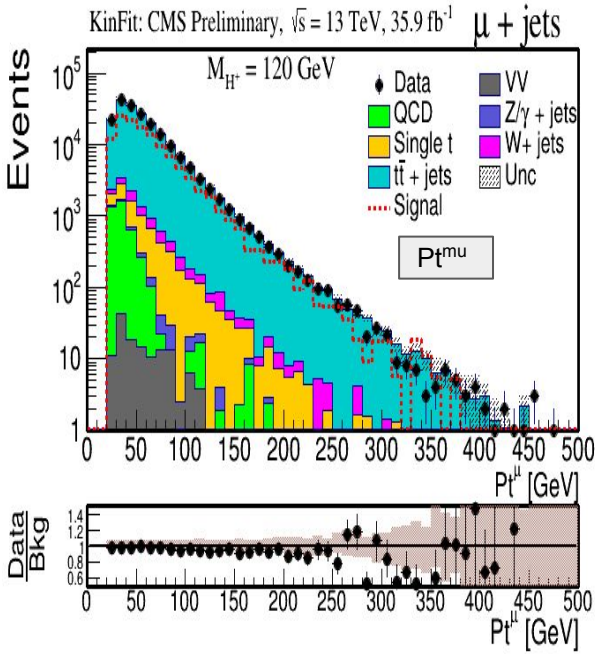
Muon+jets channel

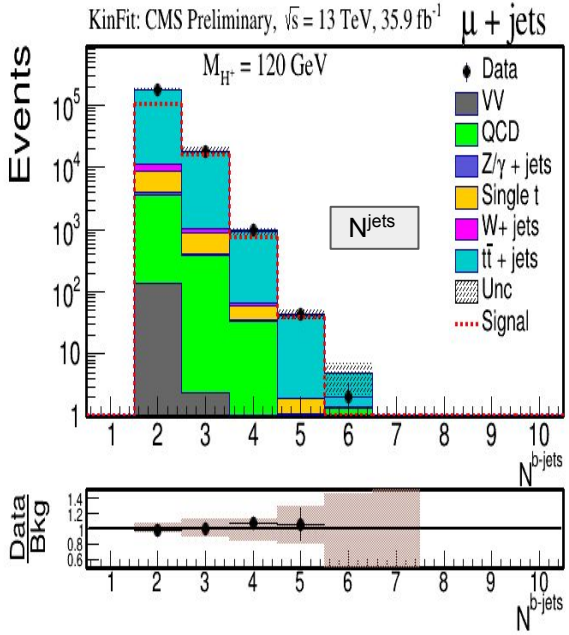
Source	N_{events} ± MC stat ± JEC/MET/Top ± bTag ± cTag ± Pileup
HW, $M_H = 80\ GeV/c^2$	94973.6 ± 796.2 ± 6490.1 ± 3665.6 ± 1402.2 ± 1253.8
HW, $M_H = 90\ GeV/c^2$	97799.8 ± 802.9 ± 7330.4 ± 3227.7 ± 1806.5 ± 1206.6
HW, $M_H = 100\ GeV/c^2$	98909.0 ± 804.7 ± 7782.9 ± 3201.1 ± 1498.0 ± 968.7
HW, $M_H = 120\ GeV/c^2$	96226.8 ± 794.7 ± 6443.7 ± 3346.8 ± 2038.0 ± 1217.8
HW, $M_H = 140\ GeV/c^2$	76469.9 ± 710.2 ± 6268.7 ± 2684.0 ± 1343.0 ± 691.4
HW, $M_H = 150\ GeV/c^2$	55178.6 ± 600.8 ± 4936.3± 2330.8 ± 804.7 ± 505.5
HW, $M_H = 155\ GeV/c^2$	43471.8 ± 542.8 ± 4971.4 ± 1774.6 ± 492.1 ± 582.2
HW, $M_H = 160\ GeV/c^2$	33503.8 ± 467.4 ± 3445.6 ± 1526.6 ± 1026.1 ± 452.7
SM $t\bar{t}$	139609 ± 235.1 ± 10046.5 ± 4825.6 ± 2727.8 ± 1630.5
W + jets	1972.0 ± 71.4 ± 343.0 ± 114.8 ± 63.9 ± 56.1
Z/γ +jets	418.1 ± 15.0 ± 78.0 ± 24.0 ± 14.3 ± 19.9
QCD	4958.0 ± 173.5
Single t	3951.0 ± 36.1 ± 412.6 ± 121.4 ± 86.6 ± 32.1
VV	61.5 ± 12.7 ± 23.7 ± 9.0 ± 6.5 ± 2.5
Total Bkg	150970.1 ± 325.0 ± 10061.1± 4828.5 ± 2729.5 ± 1631.9
Data	147145

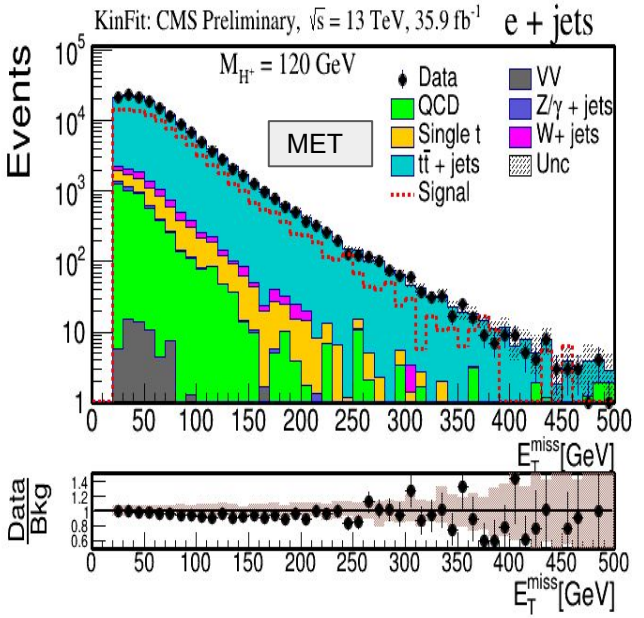
Electron+jets channel

Only statistical uncertainty on QCD, because it is estimated from data

Control Plots After KinFit : Pt^{lep},N^{jets}, MET







Good agreement between data and MC within the uncertainties. Similar matching for other variables for muon + jets channel. Similar trend for electron + jets channel also.

Exclusion limit on BR(t-> H^+b), using Mjj from different event categories

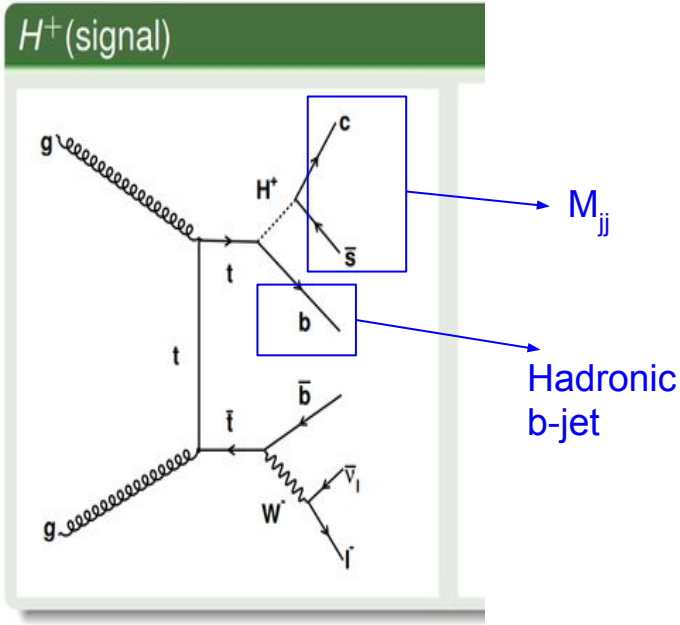
Case-1
(8 TeV):
Using Mjj from Inclusive event category(no charm tagging)

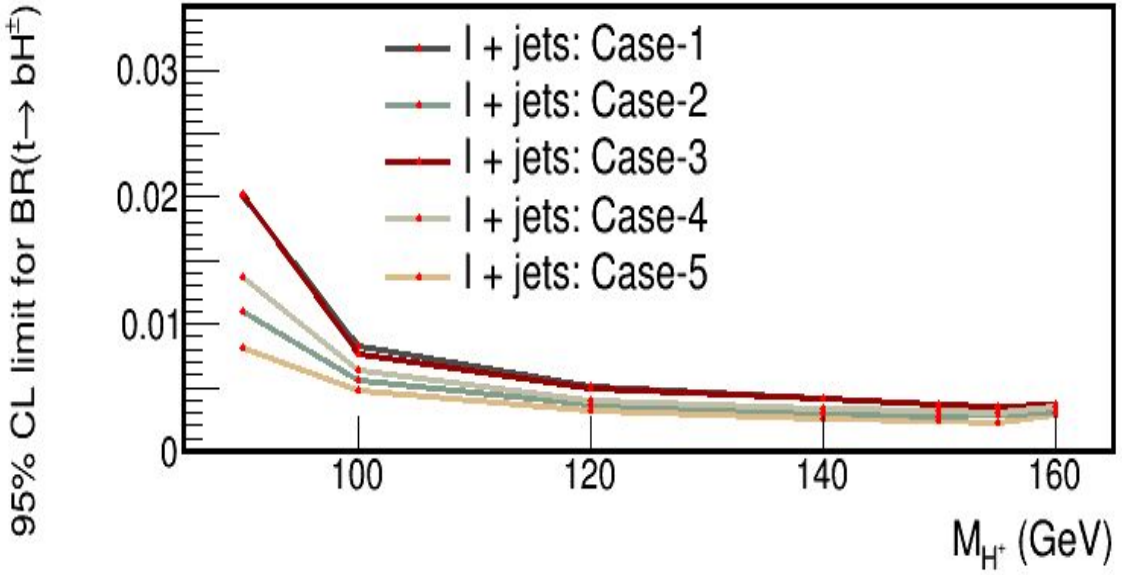
Case-2:
Using Mjj from event categorization in bins of pT Had bjet (associated W decaying hadronically)

Case-3:
Using Mjj from inclusive event categories with loose charm-jet tagging

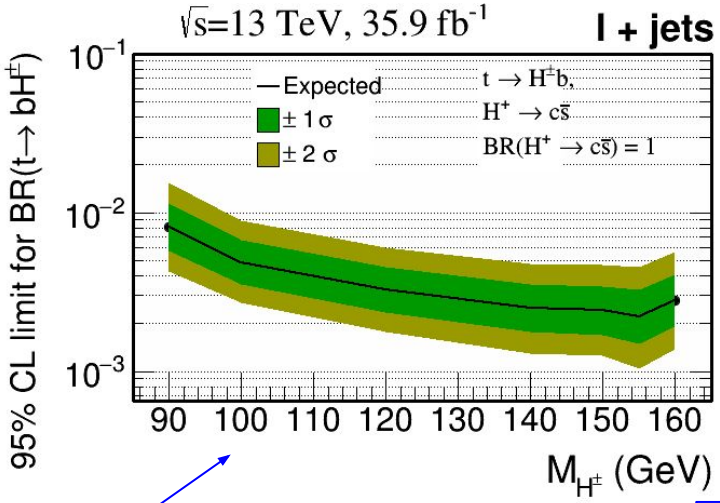
Case-4:
Using Mjj from exclusive event categories based on Loose, M, T, charm-tagging

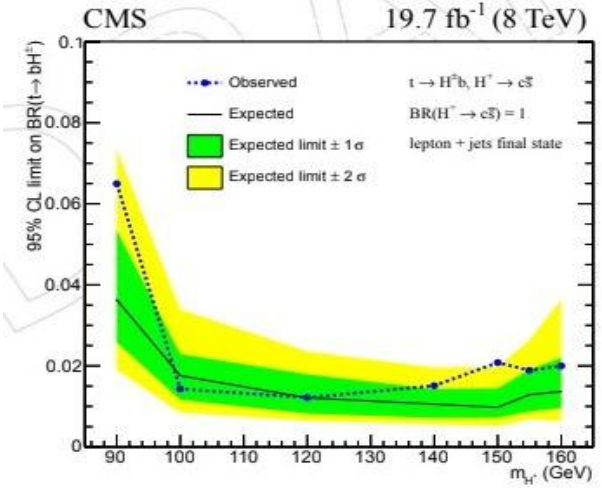
Case-5:
Using Mjj from exclusive event categories based on charm-tagging and pT Had bjet bins.





Final Limits: 13 TeV vs 8 TeV





Only expected limit at 13 TeV because the data is still blinded.

$M_{H^\pm}$(GeV)	-2σ	-1σ	median	$+1\sigma$	$+2\sigma$
90	0.42 (1.9)	0.57 (2.6)	0.81 (3.6)	1.14 (5.3)	1.53 (7.3)
100	0.27 (0.9)	0.35 (1.2)	0.48 (1.8)	0.66 (2.3)	0.89 (3.4)
120	0.17 (0.6)	0.23 (0.8)	0.32 (1.2)	0.45 (1.8)	0.60 (2.4)
140	0.13 (0.6)	0.17 (0.7)	0.24 (1.1)	0.35 (1.4)	0.47 (2.0)
150	0.12 (0.5)	0.16 (0.7)	0.24 (1.0)	0.34 (1.4)	0.46 (2.0)
155	0.10 (0.7)	0.14 (0.9)	0.22 (1.3)	0.32 (1.9)	0.45 (2.6)
160	0.13 (0.6)	0.19 (1.0)	0.27 (1.4)	0.40 (2.2)	0.56 (3.6)

Table 6: Expected 95% CL limit on $\mathcal{BR}(t \to bH^+)$ (in percent) from 13 TeV (8 TeV) for lepton + jets channel.

The limit at 13 TeV is better as that of 8 TeV by a factor of ~4

Conclusion

- Good agreement between data, MC within the uncertainties
- Expected exclusion limit on the branching ratio of t-> H^+ b at 13 TeV for Lepton+jets channel:
  - Case-1: Using Inclusive Mjj (no Charm Tagging): 0.36-2.00%
  - Case-2: Using Inclusive Mjj (no Charm Tagging) from bins of b-jet pT: 0.30-1.10%
  - Case-3: Using Mjj from Inclusive Charm Categories: 0.37-2.00%
  - Case-4: Using Mjj from Exclusive Charm Categories: 0.34-1.40%
  - Case-5: Using Mjj from Exclusive Charm Categ and from bins of b-jet pT : **0.28-0.81%**
- At 8 TeV, for lepton + jets channel, the expected limit was = **1.4-3.6%**

- The Analysis Note is at pre approval stage:
  http://cms.cern.ch/iCMS/jsp/openfile.jsp?tp=draft&files=AN2018_061_v3.pdf

Tag Validation: Workflow submission and management in the AlCaDB subgroup

Pritam, Ravindra, Bajrang, **Luca, Arun, and Giovanni**

Content

1. **Overview of Validation Procedure**

   Step-1: New tag request from different groups
   Step-2: Preparing request email with detailed information
   Step-3: Submitting the RelVals using wmcontrol package
   Step-4: The data-ops send an email after the submission
   Step-5: Email from dataops when the relvals are available
   Step-6: We announce the availability to the validators
   Step-7: Validators give green lights
   Step-8: Finally, deployment of the Tags

Convenors
Giovanni Franzoni,
Luca Pernie,
and Arun Kumar

2. **Validations from 2017**

Ravindra and Bajrang
(submitted 687 workflows in 2017)

https://twiki.cern.ch/twiki/bin/viewauth/CMS/PdmVTriggerConditionValidation2017

3. **Validations from 2018**

https://twiki.cern.ch/twiki/bin/viewauth/CMS/PdmVTriggerConditionValidation2018

4. **Summary**

Ravindra and Pritam
(submitted 126 workflows so for)

Validation history of 2017: Week 2-34

Validation 2017: Twiki

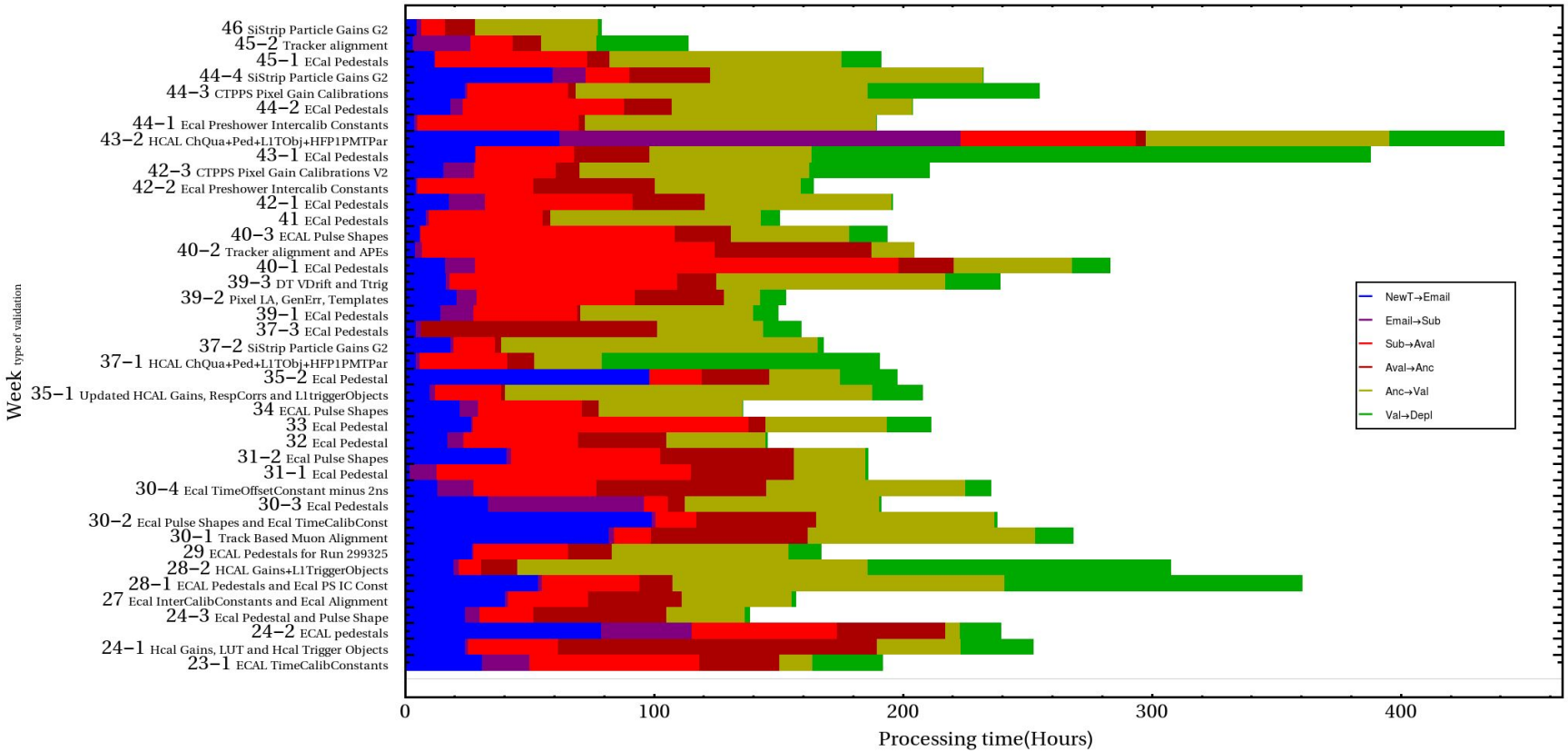
Week	Type of validation	New Tag	Email Requested	Submitted	Availablity	Announced	Validated	Deployed	JIRA Link
2	Vertex Distance Scale	InternalValidation	Jan 11, 05:17	Jan 11, 12:48	Jan 19, 09:50	InternalValidation	InternalValidation	InternalValidation	BeforeJIRA
8	SiStrip APV Gain	InternalValidation	Feb 20, 12:48	Feb 20, 13:12	Feb 21, 06:43	Feb 21,12:06	Feb 23, 0:13	InternalValidation	BeforeJIRA
21	Ecal Pulse Shapes	May 23, 18:49	May 24, 20:15	Jun 01, 10:44	Jun 02, 01:02	Jun 02, 9:26	Jun 06, 11:32	NotKnown	BeforeJIRA
22	HcalGains and L1TriggerObjects	May 29, 07:58	InternalValidation	May 30, 13:46	Jun 03, 04:40	Jun 03, 17:11	Jun 5, 1:48	InternalValidation	BeforeJIRA
23	ECAL TimeCalibConstants	Jun 07, 08:10	Jun 08, 15:00	Jun 07, 19:44	Jun 10, 15:48	Jun 11, 23:53	Jun 12, 13:18	Jun 13, 17:40	BeforeJIRA
	Tracker Alignment	InternalValidation	Jun 06, 22:15	Jun 07, 14:17	Jun 11, 02:32	Jun 11, 21:40	Jun 14, 02:35	InternalValidation	BeforeJIRA
	Tracker Alignment Extended Errors	InternalValidation	Jun 06, 22:15	Jun 07, 15:44	Jun 10, 10:27	Jun 12, 01:10	Jun 14, 6:04	InternalValidation	BeforeJIRA
24	Hcal Gains, LUT and Hcal Trigger Objects	Jun 15, 16:24	Jun 16, 16:23	Jun 16, 17:44	Jun 18, 05:50	Jun 23, 13:48	Jun 24, 23:38	Jun 26, 04:42	BeforeJIRA
	ECAL pedestals	Jun 16, 18:35	Jun 20, 01:12	21 Jun, 13:45	Jun 24, 00:01	Jun 25, 19:23	Jun 26, 1:24	Jun 26, 18:05	BeforeJIRA
25	Tracker Alignment and APEs	InternalValidation	Jun 21, 14:39	Jun 24, 14:44	Jun 24, 21:59	Jun 24, 19:08	Jun 26, 15:58	InternalValidation	BeforeJIRA
	Tracker Alignment and Pixel Reco	InternalValidation	Jun 24, 18:05	Jun 21, 12:15	Jun 23, 22:56	Jun 25, 15:53	Jun 27, 12:00	InternalValidation	BeforeJIRA
	Ecal Pedestal and Pulse Shape	Jun 24, 15:55	Jun 25, 15:52	Jun 25, 09:44	Jun 26, 07:09	Jun 28, 12:33	Jun 29, 19:59	Jun 29, 17:48	BeforeJIRA
27	Ecal InterCalibConstants and Ecal Alignment	Jul 3, 00:00	Jul 4, 16:05	Jul 4, 17:13	Jul 6, 01:20	Jul 7, 15:01	Jul 9, 11:19	Jul 9, 13:13	BeforeJIRA
	EcalADCToGeVConstant	Jul 5, 22:09	Jul 6, 14:56	Jul 6, 16:15	Jul 7, 22:00	Jul 7, 15:33	Jul 9, 11:19	NotKnown	BeforeJIRA
28	ECAL Pedestals and Ecal PS IC Const	Jul 09, 17:11	Jul 11, 22:39	Jul 11, 21:14	Jul 13, 12:26	Jul 14, 01:39	Jul 19, 14:56	Jul 24, 14:37	CMSALCA-10
	HCAL Gains+L1TriggerObjects	Jul 11, 23:38	Jul 12, 18:56	Jul 12, 16:44	Jul 13, 01:56	Jul 13, 16:11	Jul 19, 13:04	Jul 24, 14:58	CMSALCA-11
	JEC for Run 298678	InternalValidation	Jul 13, 20:52	Jul 13, 19:43	Jul 13, 23:56	Jul 14, 18:20	Jul 18, 15:00	Jul 24, 15:10	CMSALCA-12
	JEC for Run 297723	InternalValidation	Jul 13, 20:52	Jul 13, 20:44	14 Jul, 2017	Jul 14, 18:25	Jul 19, 15:10	Jul 24, 15:11	CMSALCA-13
29	ECAL Pedestals for Run 299325	Jul 18, 08:39	Jul 19, 11:32	Jul 19, 12:13	Jul 21, 01:59	Jul 21, 19:34	Jul 24, 18:43	Jul 25, 07:58	CMSALCA-14
	ECAL TimeCalibConstants	Jul 19, 16:35	Jul 21, 10:11	Jul 20, 16:15	Jul 21, 17:49	InternalValidation	InternalValidation	InternalValidation	CMSALCA-15
30	Track Based Muon Alignment	Jul 21, 22:35	Jul 25, 08:21	Jul 25, 10:22	Jul 26, 01:23	Jul 28, 16:23	Aug 1, 11:40	Aug 2, 02:54	CMSALCA-16
	Ecal Pulse Shapes and Ecal TimeCalib	Jul 21, 18.18	Jul 25, 21:14	Jul 25, 22:46	Jul 26, 15:24	Jul 28, 15:15	Jul 31, 15:06	Jul 31, 16:21	CMSALCA-17
	Ecal Pedestals	24 Jul, 2017	Jul 25, 21:19	Jul 28, 12:00	Jul 28, 02:30	Jul 28, 09:25	Jul 31, 15:29	Jul 31, 16:22	CMSALCA-18
	Ecal TimeOffsetConstant minus 2ns	Jul 25, 08:24	Jul 25, 21:20	Jul 26, 12:00	Jul 28, 13:13	Jul 31, 09:34	Aug 3, 17:21	Aug 4, 03:51	CMSALCA-19
	Ecal TimeOffsetConstant minus 1ns	Jul 25, 08:24	Jul 25, 21:20	Jul 26, 12:00	Jul 28, 02:30	Jul 31, 15:42	Aug 3, 17:25	Aug 4, 03:51	CMSALCA-20
	Ecal TimeOffsetConstant plus 1ns	Jul 25, 08:24	Jul 25, 21:20	Jul 26, 12:00	Jul 28, 22:52	Jul 31, 16:18	Aug 3, 17:12	Aug 4, 03:51	CMSALCA-21
	Ecal TimeOffsetConstant plus 2ns	Jul 25, 08:24	Jul 25, 21:20	Jul 26, 12:00	Jul 28, 13:13	Jul 31, 16:20	Aug 3, 16:54	Aug 4, 03:51	CMSALCA-22
31	Ecal Pedestal	Jul 31, 19:14	Jul 31, 21:04	Aug 01, 07:46	Aug 05, 14:03	Aug 7, 07:18	Aug 8, 11:59	Aug 8, 13:09	CMSALCA-23
	SiStrip Particle Gains G2	Jul 28, 12:26	Aug 01, 10:53	Aug 01, 07:46	Aug 02, 13:17	Aug 2, 13:40	Aug 10, 11:32	not deployed	CMSALCA-24
	Ecal Pulse Shapes	Jul 31, 19:14	Aug 02, 12:00	Aug 02, 13:45	Aug 05, 01:36	Aug 7, 07:21	Aug 8, 12:00	Aug 8, 13:14	CMSALCA-25
32	Ecal Pedestal	Aug 07, 17:38	Aug 08, 10:43	Aug 08, 17:04	Aug 10, 14:57	Aug 9, 03:16	Aug 10, 18:50	Aug 10, 19:58	CMSALCA-26
33	Ecal Pedestal	Aug 15, 15:23	Aug 16, 17:55	Aug 16, 17:15	Aug 21, 08:08	Aug 21, 14:52	Aug 23, 15:39	Aug 24, 09:23	CMSALCA-27
34	Ecal Pedestal	Aug 21, 13:52	Aug 22, 09:19	Aug 22, 01:50	Aug 25, 05:47	Aug 28, 12:50	Aug 29, 19:12	NotKnown	CMSALCA-28
	CTPPS Pixel Gain Calibrations V2	InternalValidation	Aug 23, 04:32	Aug 23, 15:15	Aug 24, 02:19	Aug 23, 10:17	Aug 28, 12:38	Aug 28, 12:38	CMSALCA-29
	CTPPS Pixel Gain Calibrations V3	InternalValidation	Aug 23, 04:32	Aug 23, 17:15	Aug 24, 06:17	Aug 23, 10:20	Aug 28, 12:39	Aug 28, 12:39	CMSALCA-30
	ECAL Pulse Shapes	Aug 22, 18:05	Aug 23, 16:08	Aug 23, 08:46	Aug 25, 02:16	Aug 25, 09:07	Aug 27, 18:52	Aug 27, 19:04	CMSALCA-31

We moved to JIRA after Week-28

InternalValidation (these validations are discussed in the AlCaDB meeting or privately)

All the dates are quoted from HN, in some cases we get 2nd email sooner than the 1st email.

Validation history of 2017



Summary

- In 2017, we carried out 75 validations (HLT, PROMPT, ReReco)
  - Submitted 687 workflows
  - https://twiki.cern.ch/twiki/bin/viewauth/CMS/PdmVTriggerConditionValidation2017
- In 2018, we have carried out 14 validations (HLT, PROMPT, ReReco)
  - Submitted 126 workflows
  - https://twiki.cern.ch/twiki/bin/viewauth/CMS/PdmVTriggerConditionValidation2018
- Got 4 months EPR credit.

Fetching LHC Fill Information from Online DB to Offline DB (Upgradation of Fill Info O2O package)

Amey Noolkar and Ravindra K Verma

Content

1. Architecture and Flowchart of O2O
2. New Attributes Added to CondFormat/FillInfo.h
   a. CTTPS group: lhcState, lhcComment, ctppsStatus, lumiSection
   b. ECAL group: beam1VC, beam2VC, beam1RF, beam2RF
   c. From Other group: delivLumi, recLumi, lumiPerBx
3. Acron Scheduler to Trigger FillInfo O2O
4. Summary
   a. The modified package was officially merged in the CMSSW_10_X_Y
   b. Got 2 months of EPR credit.

Architecture

FillInfo O2O works at this step.
It fetches Fill information (such as energy of beams, magnetic field, luminosity per bunch crossing etc) from OMDS and stores to the ORCON.

OMDS: Online Master DataBase System
ORCON: Offline Reconstruction Condition database for ONline use.

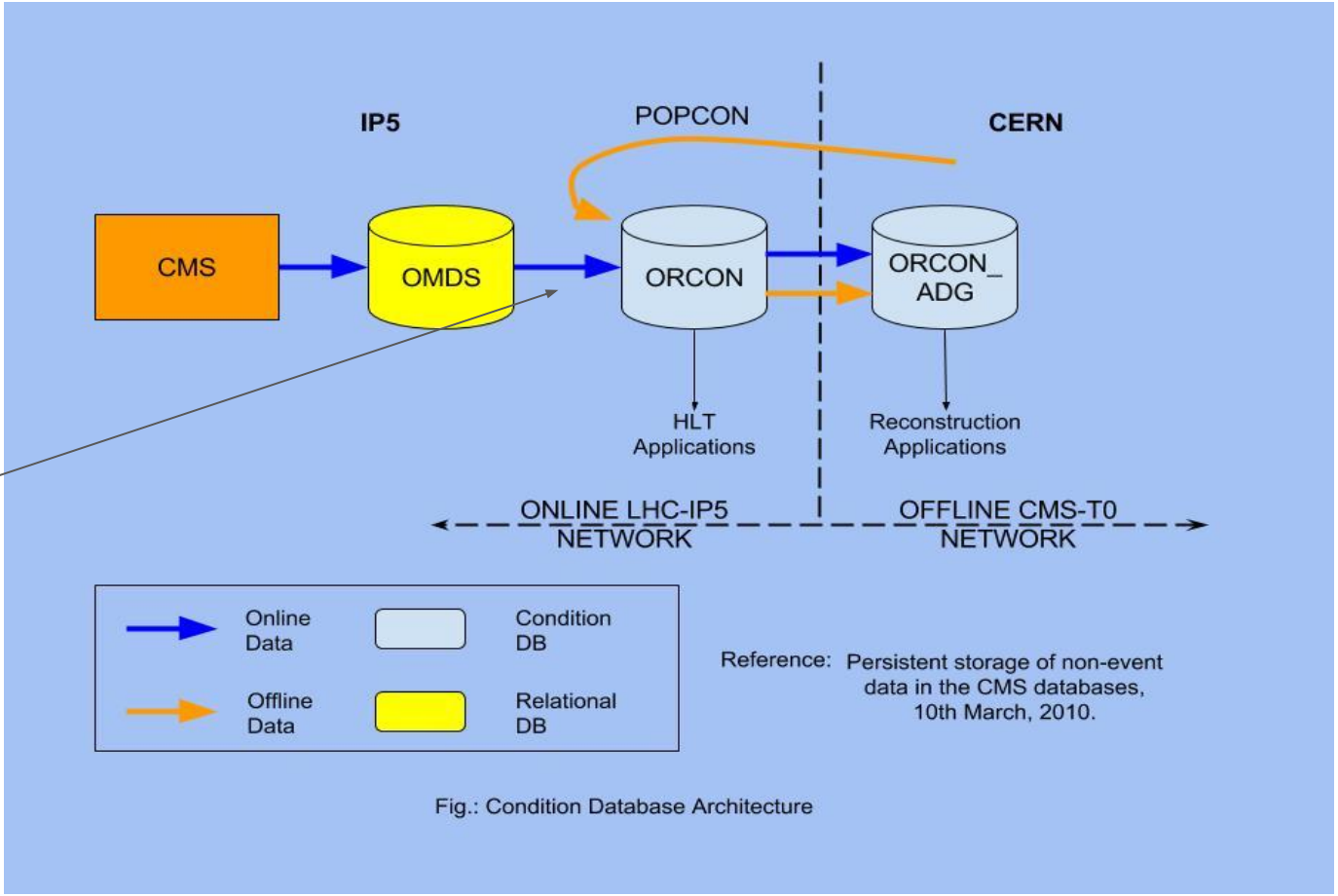
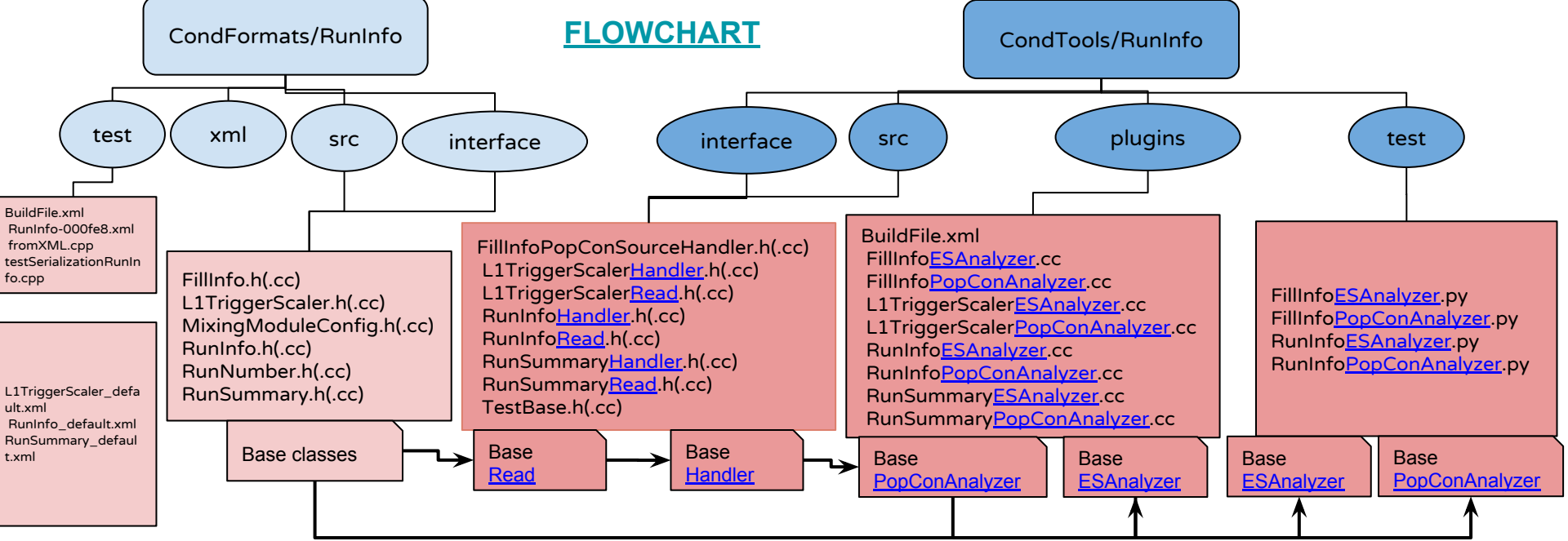
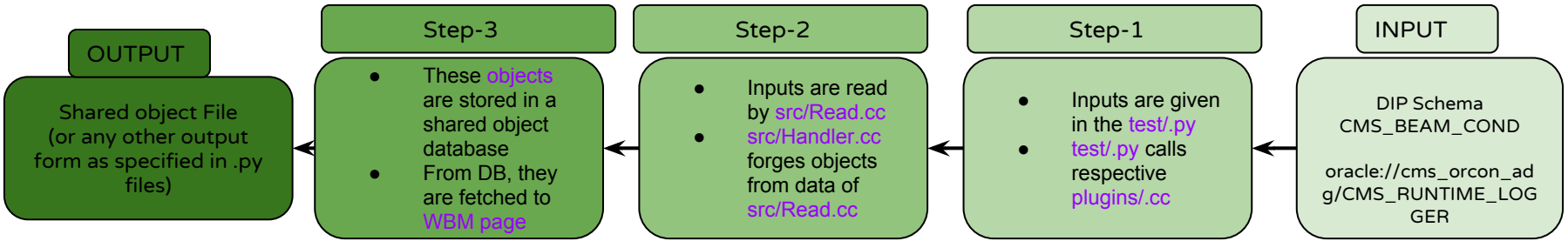


Fig.: Condition Database Architecture

FLOWCHART


CondFormats/RunInfo
CondTools/RunInfo
test
xml
src
interface
interface
src
plugins
test
BuildFile.xml
RunInfo-000fe8.xml
fromXML.cpp
testSerializationRunInfo.cpp
L1TriggerScaler_default.xml
RunInfo_default.xml
RunSummary_default.xml
FillInfo.h(.cc)
L1TriggerScaler.h(.cc)
MixingModuleConfig.h(.cc)
RunInfo.h(.cc)
RunNumber.h(.cc)
RunSummary.h(.cc)
FillInfoPopConSourceHandler.h(.cc)
L1TriggerScalerHandler.h(.cc)
L1TriggerScalerRead.h(.cc)
RunInfoHandler.h(.cc)
RunInfoRead.h(.cc)
RunSummaryHandler.h(.cc)
RunSummaryRead.h(.cc)
TestBase.h(.cc)
BuildFile.xml
FillInfoESAnalyzer.cc
FillInfoPopConAnalyzer.cc
L1TriggerScalerESAnalyzer.cc
L1TriggerScalerPopConAnalyzer.cc
RunInfoESAnalyzer.cc
RunInfoPopConAnalyzer.cc
RunSummaryESAnalyzer.cc
RunSummaryPopConAnalyzer.cc
FillInfoESAnalyzer.py
FillInfoPopConAnalyzer.py
RunInfoESAnalyzer.py
RunInfoPopConAnalyzer.py
Base classes
Base Read
Base Handler
Base PopConAnalyzer
Base ESAnalyzer
Base ESAnalyzer
Base PopConAnalyzer


OUTPUT
Shared object File (or any other output form as specified in .py files)
Step-3
These objects are stored in a shared object database
From DB, they are fetched to WBM page
Step-2
Inputs are read by src/Read.cc
src/Handler.cc forges objects from data of src/Read.cc
Step-1
Inputs are given in the test/.py
test/.py calls respective plugins/.cc
INPUT
DIP Schema CMS_BEAM_COND
oracle://cms_orcon_adg/CMS_RUNTIME_LOGGER

Summary

Added following other attributes suggested by different group

- CTTPS group: lhcState, lhcComment, ctppsStatus, lumiSection
- ECAL group: beam1VC, beam2VC, beam1RF, beam2RF
- From Other group: delivLumi, recLumi, lumiPerBx

- The modified FillInfo package was officially merged in the CMSSW 10_X_Y on 11th/20th March 2018
  - https://github.com/cms-sw/cmssw/pull/22527#event-1514741512
  - https://github.com/cms-sw/cmssw/pull/22668#event-1542523437

- Got 2 months of EPR credit.

THANK YOU