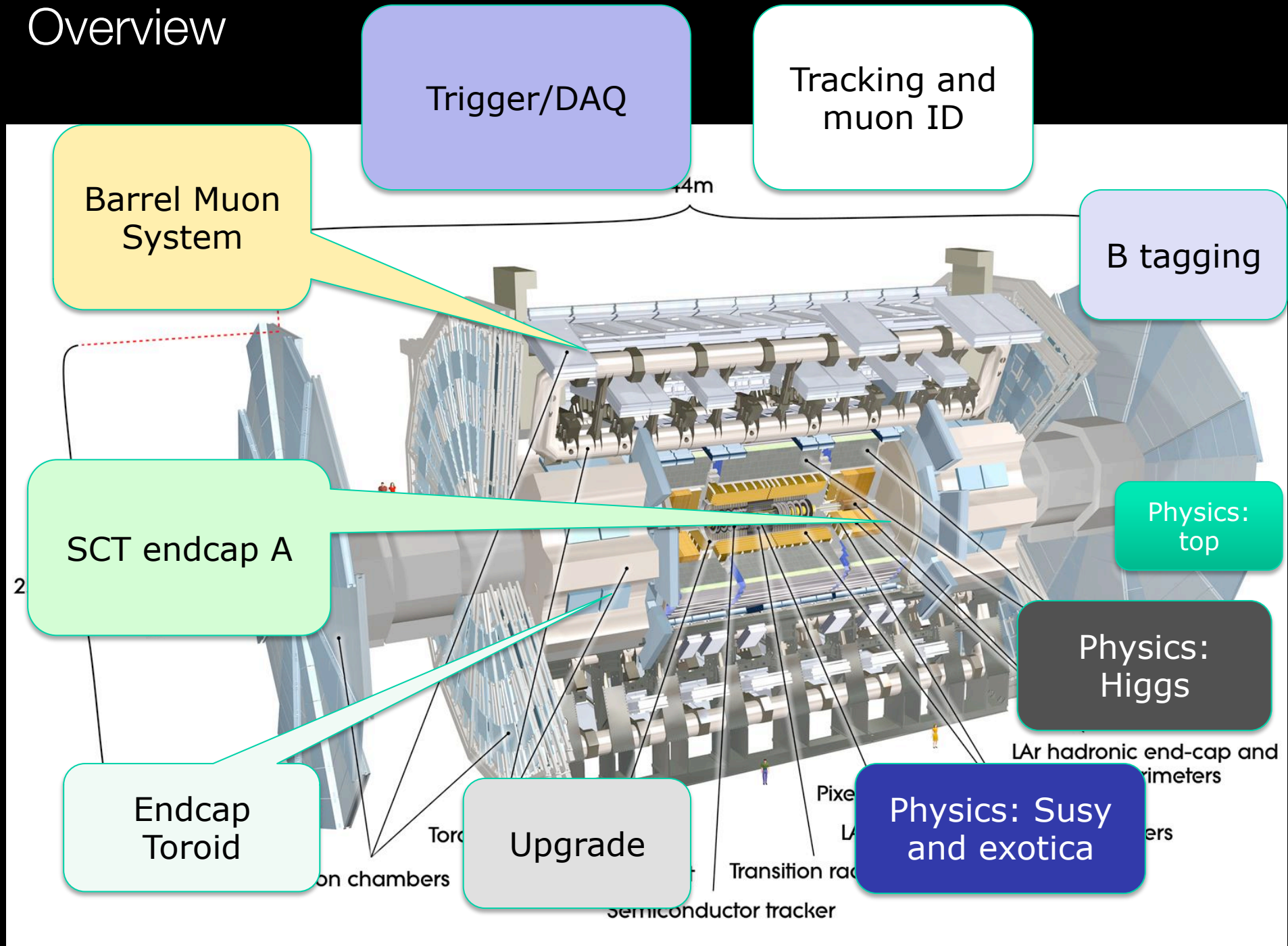


ATLAS



Overview



People, prizes and awards

- **Hella Snoek**
will join ATLAS
1-1-2016



- **Pamela Ferrari**
convener of
 $H \rightarrow WW$ group
(since 1-3-2015)



- **Paul de Jong**
Chair of
Publications
Committee
(since 1-3-2015)



- **Olya Igonkina**
Express stream
coordinator (since
1-11-2014)



- **David Salek**
Convener of
luminosity group
(since 1-6-2015)



- **Jochen Meyer**
Muon software
coordinator
(since 2014)



- **Pierfrancesco Butti**
Convener of
alignment subgroup
(since 1-4-2015)



People, prizes and awards

- **Wouter Verkerke**
convener of
Higgs combination
subgroup
& Statistics Forum
(until 1-10-2015)
- **David Berge**
Convener of
Astroparticle physics
forum
(until 1-10-2015)
- **Noam Tal Hod**
Convener of
Lepton+X
Exotics subgroup
(1-10-2015)



Snellius Medal 2015



*Awarded for the Dutch contribution
to the Higgs boson discovery*



Grants awarded in 2015

2x **Accelerating Scientific Discovery** grant (National eScience Center)

'Automated Parallel Calculation of Collaborative Statistical Models'



1 postdoc +
2.5 FTE of
eScience Center
manpower

'iDark: The intelligent Dark Matter Survey'



1 postdoc +
2.5 FTE of
eScience Center
manpower

Grants awarded in 2015

2x **A**ccelerating **S**cientific **D**iscovery grant (National eScience Center)

'Automated Parallel Calculation of Collaborative Statistical Models'

'iDark: The intelligent Dark Matter Survey'



1 postdoc +
2.5 FTE of
eScience Center
manpower

Related to ideas published in several pheno papers by Sascha et al

Higgs, di-Higgs and tri-Higgs production via SUSY processes at the LHC with 14 TeV

Melissa van Beekveld (Nijmegen U., IMAPP & NIKHEF, Amsterdam), Wim Beenakker (NIKHEF, Amsterdam & Amsterdam U. & Nijmegen U., IMAPP), Sascha Caron, Remco Castelijn, Marie Lanfermann, Antonia Struebig (Nijmegen U., IMAPP & NIKHEF, Amsterdam). Jan 9, 2015. 49 pp.

Published in **JHEP 1505 (2015) 044**

DOI: [10.1007/JHEP05\(2015\)044](https://doi.org/10.1007/JHEP05(2015)044)

e-Print: [arXiv:1501.02145](https://arxiv.org/abs/1501.02145) [hep-ph] | [PDF](#)

A description of the Galactic Center excess in the Minimal Supersymmetric Standard Model

Abraham Achterberg (Nijmegen U., IMAPP), Simone Amoroso (Freiburg U.), Sascha Caron (Nijmegen U., IMAPP & NIKHEF, Amsterdam), Luc Hendriks (Nijmegen U., IMAPP), Roberto Ruiz de Austri (Valencia U., IFIC), Christoph Weniger (U. Amsterdam, GRAPPA). Feb 19, 2015. 21 pp.

Published in **JCAP 1508 (2015) 08, 006**

Comparing Galactic Center MSSM dark matter solutions to the Reticulum II gamma-ray data

Abraham Achterberg, Melissa van Beekveld (Nijmegen U., IMAPP), Wim Beenakker (Amsterdam U. & Nijmegen U., IMAPP), Sascha Caron (Nijmegen U., IMAPP & NIKHEF, Amsterdam), Luc Hendriks (Nijmegen U., IMAPP). Jul 16, 2015. 4 pp.

Published in **JCAP 1512 (2015) 12, 013**

Global analysis of the pMSSM in light of the Fermi GeV excess: prospects for the LHC Run-II and astroparticle experiments

Gianfranco Bertone, Francesca Calore (U. Amsterdam, GRAPPA), Sascha Caron (Nijmegen U., IMAPP & NIKHEF, Amsterdam), Roberto Ruiz de Austri (Valencia U., IFIC), Jong Soo Kim (Madrid, IFT), Roberto Trotta (Imperial Coll., London), Christoph Weniger (U. Amsterdam, GRAPPA). Jul 24, 2015. 18 pp.

e-Print: [arXiv:1507.07008](https://arxiv.org/abs/1507.07008) [hep-ph] | [PDF](#)

Seven PhD graduating in 2015

Rosemarie



Spinning the Higgs –
Spin and parity measurement
of the discovered Higgs-like boson
in the $H \rightarrow WW \rightarrow l\nu l\nu$ decay mode

Rogier



Searches for new physics
through single top

Daniel



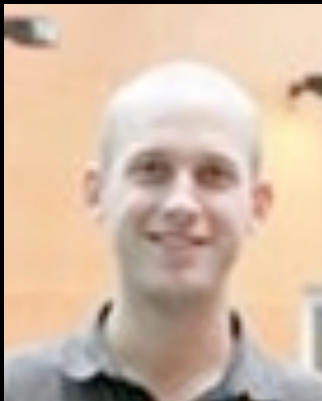
The single top t-channel fiducial
cross section at 8 TeV measured
with the ATLAS detector

Stefan



The Higgs Boson

Geert Jan



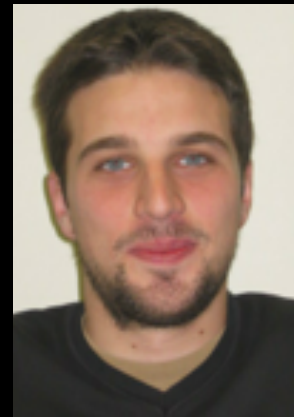
Pushing SUSY's boundaries;
searches and prospects for
strongly-produced supersymmetry
at the LHC with the ATLAS detector

Nika



Fusing the Vector Bosons –
Higgs production through VBF
and WW scattering at the
current and future LHC

Antonio



Measuring the
Higgs boson mass
using event-by-
event uncertainties”



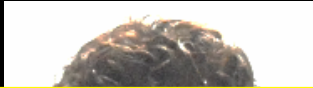
Seven PhD graduating in 2015

Rosemarie



Spinning the Higgs –
Spin and parity measurement
of the discovered Higgs-like boson
in the $H \rightarrow WW \rightarrow l\nu l\nu$ decay mode

Rogier



Daniel



Model fiducial
measured
detector

And one new arrival

Veronica



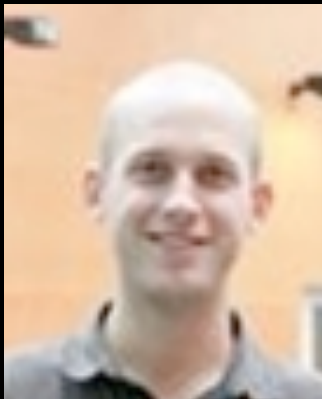
Fusing the Vector Bosons –
Higgs production through VBF
and WW scattering at the
current and future LHC

Stefan



The Higgs Boson

Geert Jan



Pushing SUSY's boundaries;
searches and prospects for
strongly-produced supersymmetry
at the LHC with the ATLAS detector



Postdoc Arrivals & departures in 2015

Carolina



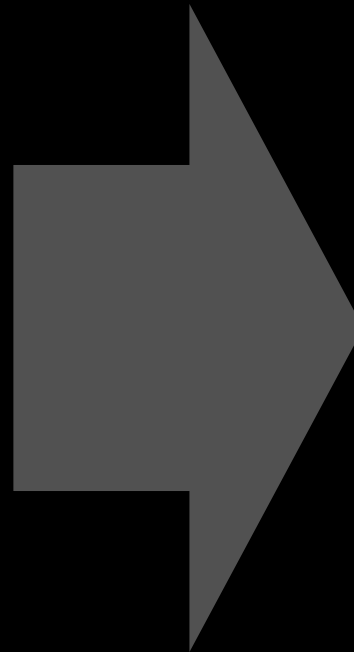
Snezana



Noam



Dominik



People – Detector & upgrade

Koral

Lucrezia

Afroditi

Adriaan

**Nigel
Marcel**

Gerjan

Peter

Els

Auke Pieter

Jos

Jochen

Bob

People – Detector & upgrade



Nigel



Marcel

Operations of SCT, muon chambers TDAQ, testbeams

Upgrade of TDAQ, Muon NSW, New Inner tracker

→ See presentation by Peter Vankov



Peter



Els



Auke Pieter



Jochen



Jos



Bob



Lucrezia



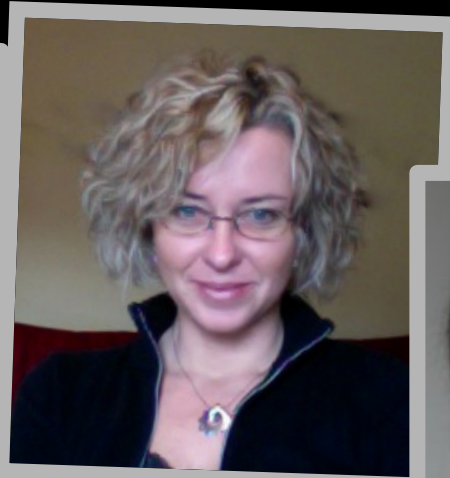
Adriaan

People – Higgs measurements & searches

Lydia



Magdalena



Marco



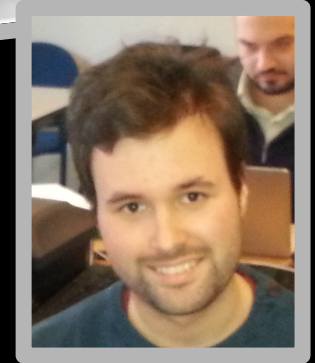
Jochen



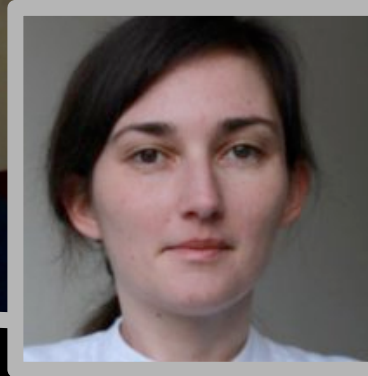
Ivo



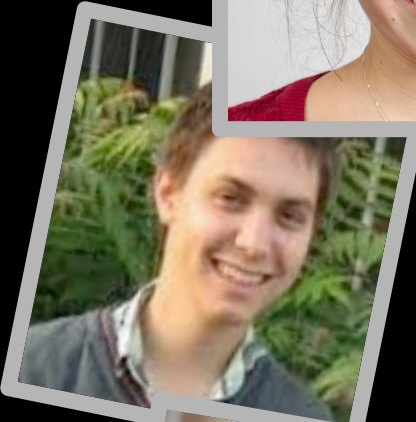
Tim



Pamela



Remco



Peter



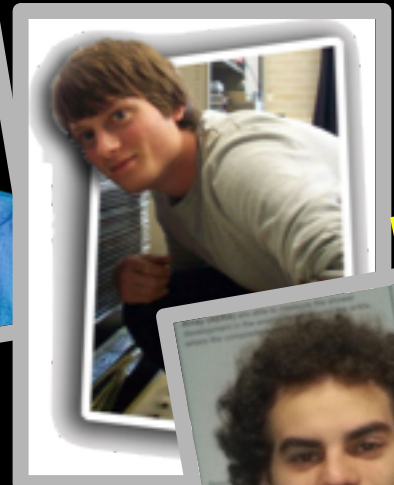
Frank



Nicolo



Luca



Nikos



Cristina



Vince



Wouter



Koen

Wouter Verkerke



People – Higgs measurements & searches

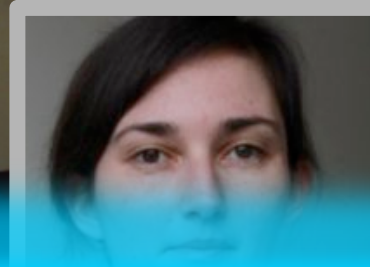
Lydia



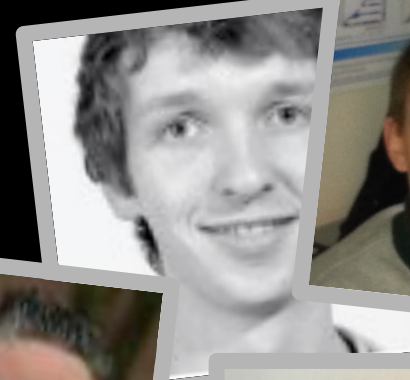
Magdalena



Ivo



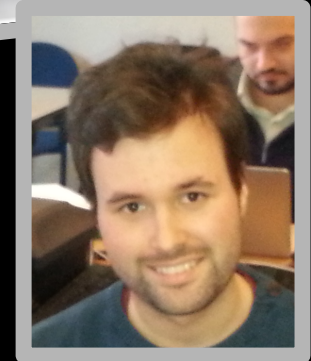
Marco



Jochen



Tim



$H \rightarrow WW, H \rightarrow ZZ, H \rightarrow \tau\tau, t\bar{t}H, h \rightarrow hh, \dots$
Coupling combinations, spin/CP analysis

→ See presentation by Snezana

Nicolo



Peter



Nikos



Luca



Cristina



Vince



Wouter



Koen



Wouter Verkerke



People – SUSY, Exotica

Joern



Hartger



Olya



Ingrid



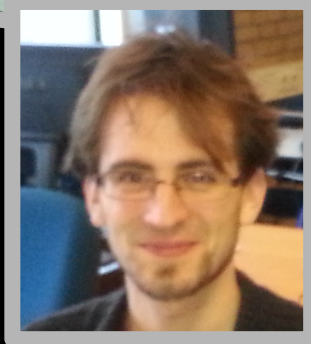
Antonia



Sarah



David S



Matteo



Sascha



Pierfrancesco

Ivan



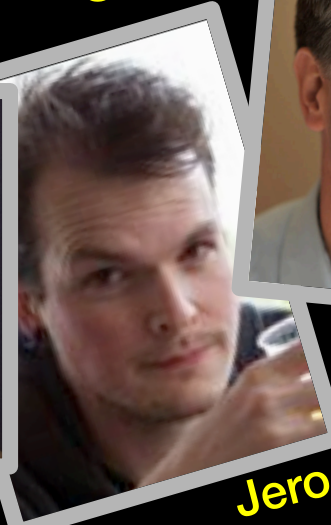
Gabriele



David B



Jeroen



Paul

People – SUSY, Exotica

Joern



Hartger



Olya



Ingrid



Antonia



Sarah



0-lepton SUSY, third generation SUSY,
Black Holes, Dark Matter (VBF, monojet),
Lepton Flavor Violation, Excited Leptons,
General searches

→ See presentations by Ingrid(SUSY), David(DM)



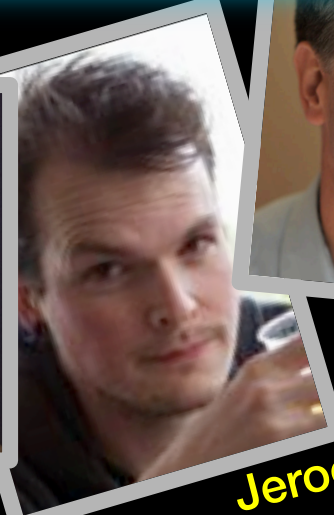
Matteo

Sascha

Ivan



David B



Jeroen



Paul

Pierfrancesco

Gabriele



People – Top and SM

Pieter



Bob



Marcel



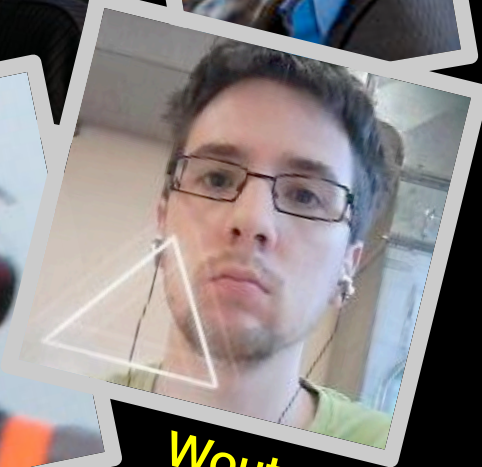
Wes



Lars

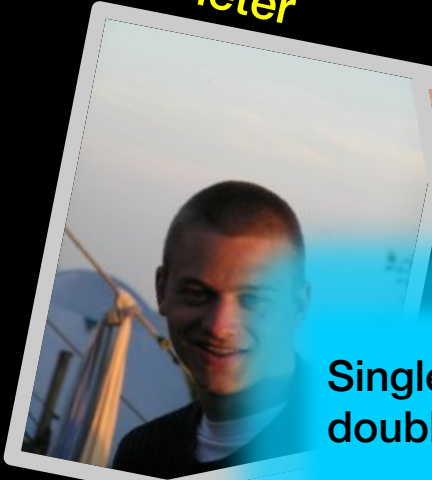


Wouter



People – Top and SM

Pieter



Bob



Single top physics, bbyy,
double parton interactions

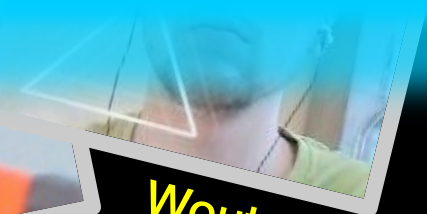
Marcel



Lars

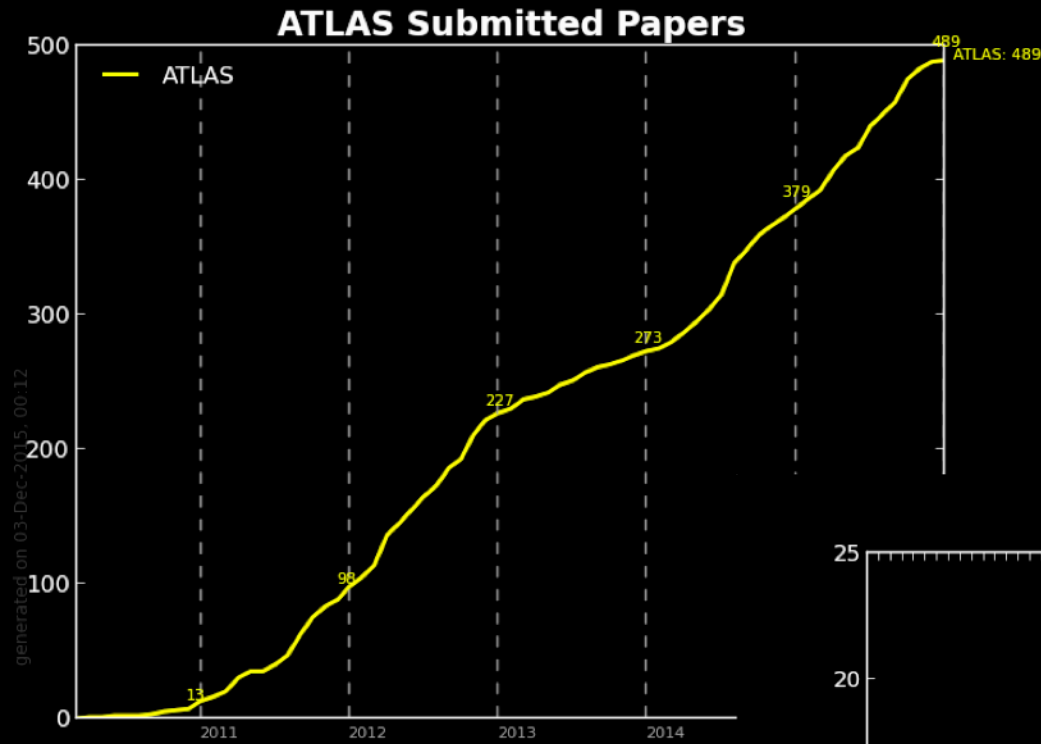


Wouter

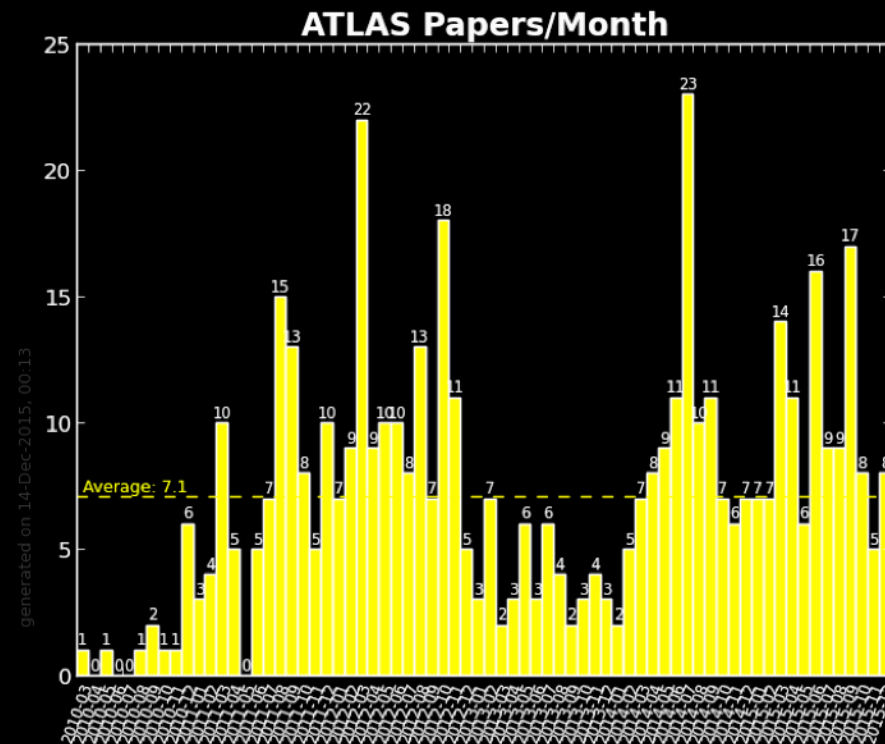


Wrapping up Run-1 – ATLAS Physics output

-



ATLAS physics output on Run-1 approaching 500 journal papers (now at 493, +3 for Run-2)



Nikhef highlight of Run-1 wrapup – Lepton Flavor Violation

Olya



Search for $\tau \rightarrow 3\mu$ LFV

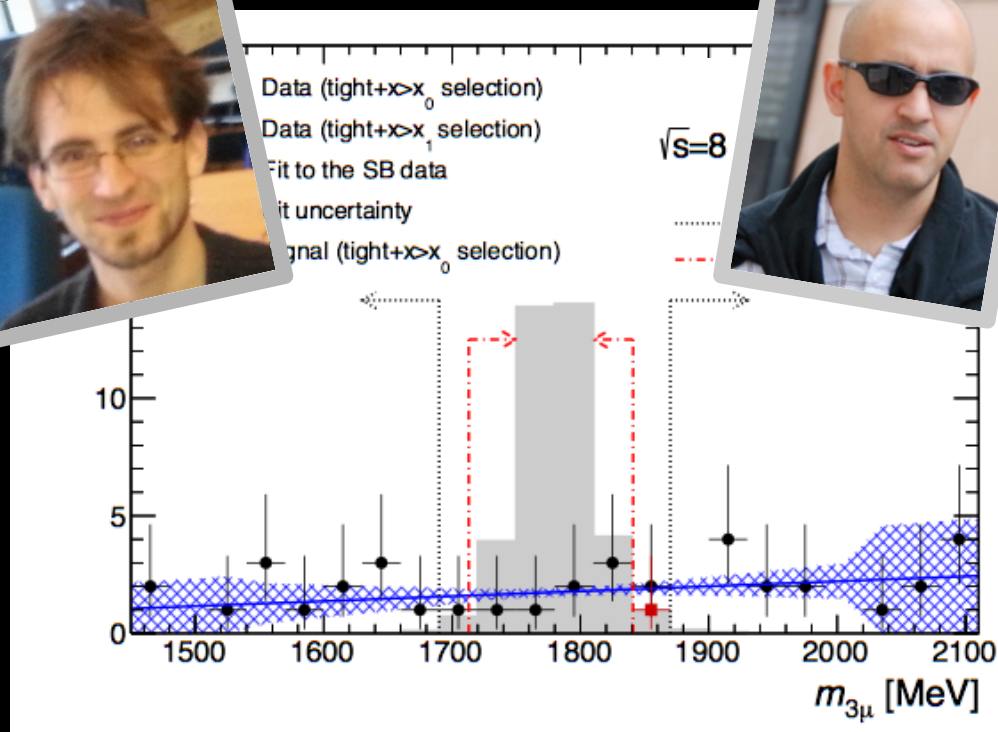
using $W \rightarrow \tau\nu$ channel;

$$Br(\tau \rightarrow 3\mu) < 3.74 \cdot 10^{-7}$$

Matteo (Expected: $3.95 \cdot 10^{-7}$) @ 90%CL



Noam



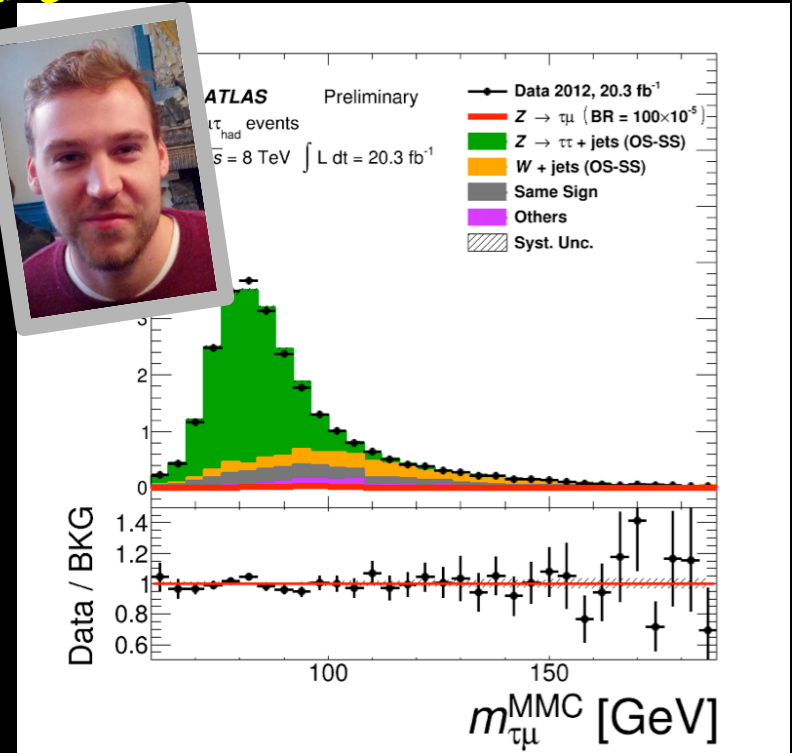
Noam & Olya

Search for $Z \rightarrow \tau\mu$ LFV

$$Br(Z \rightarrow \tau\mu) < 1.54 \cdot 10^{-5}$$

(Expected $2.44 \cdot 10^{-5}$) @ 95%CL

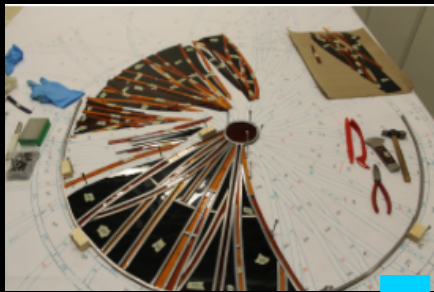
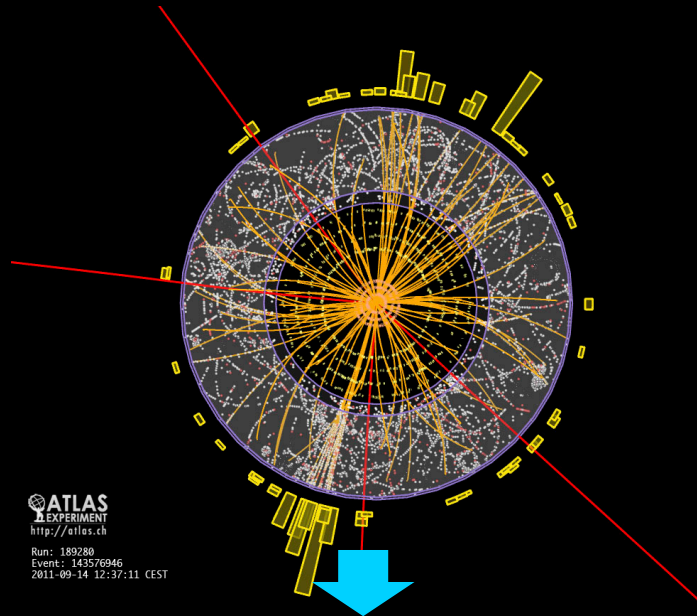
Hartger



Hartger, Olya, Pepijn Bakker & Marc de Beurs

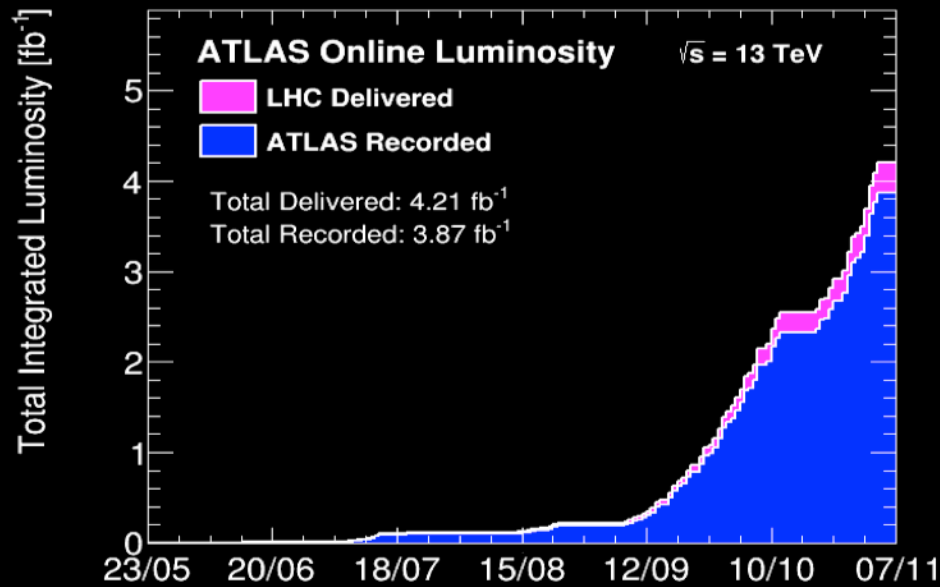
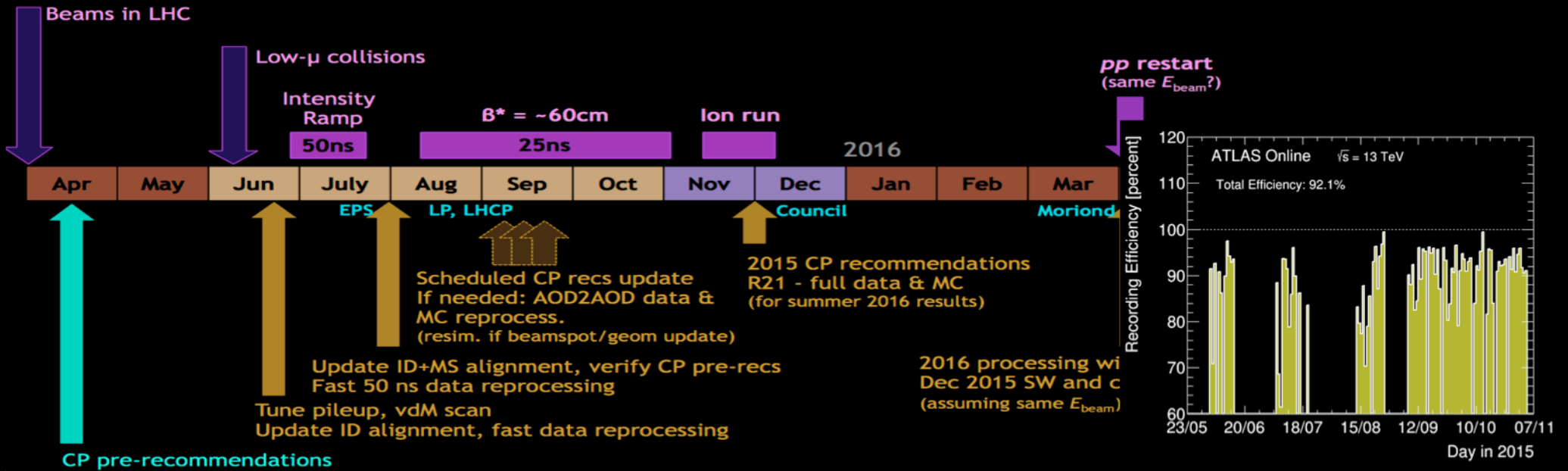
Wouter Verkerke, NIKHEF

Another special output of Run-1- inspiration for artists



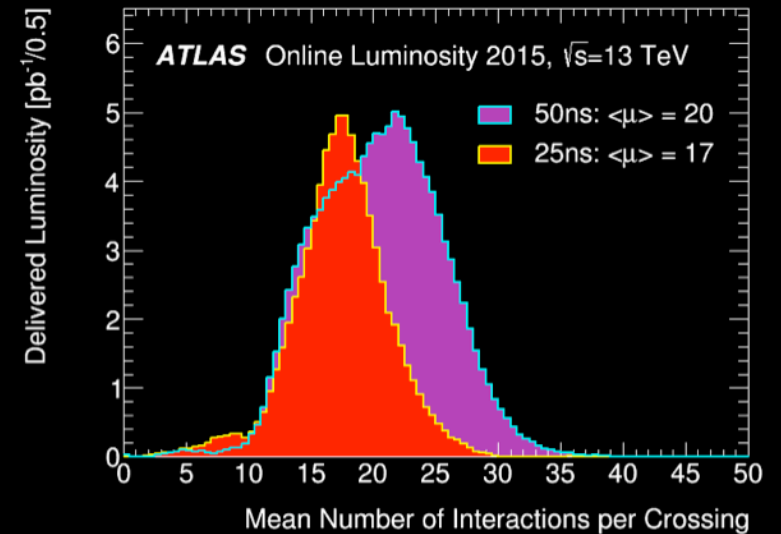
The ATLAS view of Run-2 of the LHC

Bulk of data taken < 3 months ago



+675 μ b of PbPb collisions

3.2 fb⁻¹ of data in GoodRunList



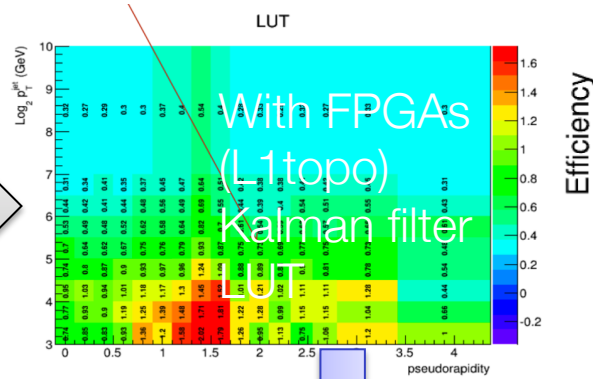
New Missing transverse momentum for ATLAS L1-trigger

Antonia,
Jeroen,
Sascha

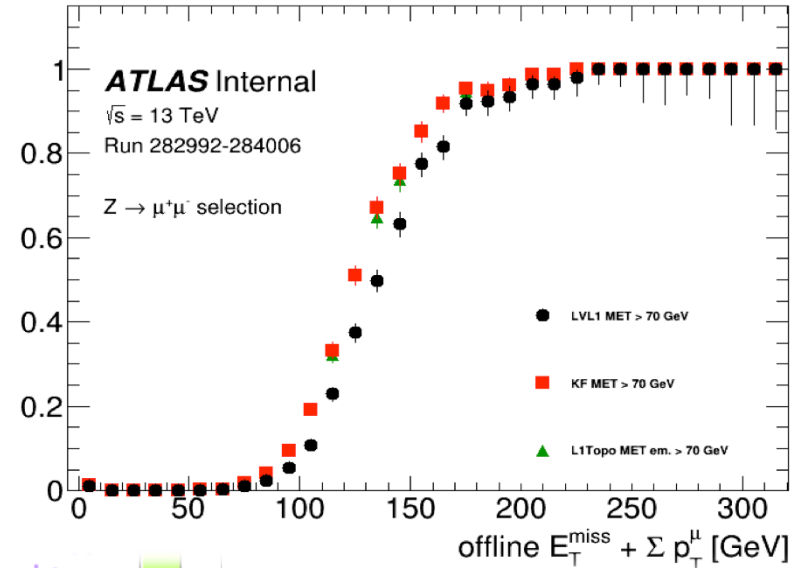
Development of a novel method to re-calculate MET via “Kalman-filter” trained look-up-tables on Level 1 FPGAs (on L1topo processor)

Level1 Calo

L1 MET, L1 Jets

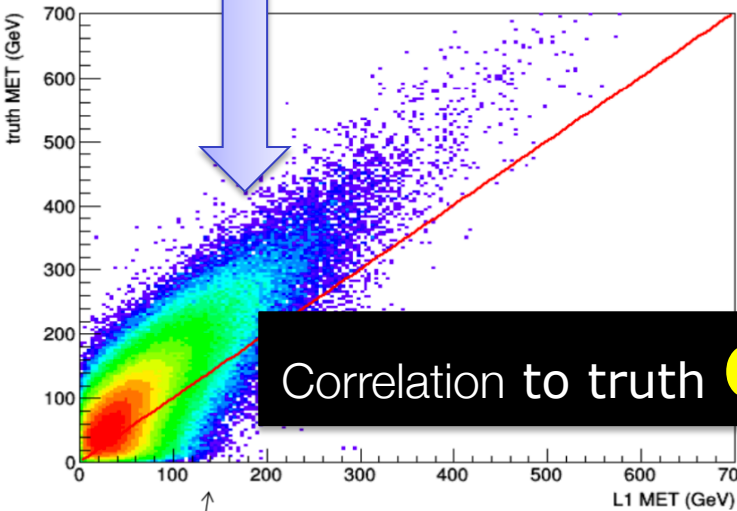


Efficiency

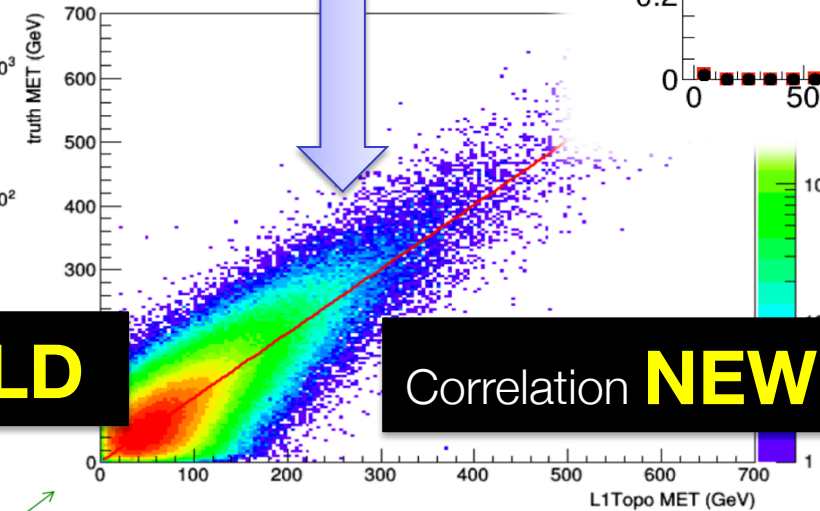


relation L1 MET - truth MET

correlation Topo MET - truth MET



Correlation to truth **OLD**

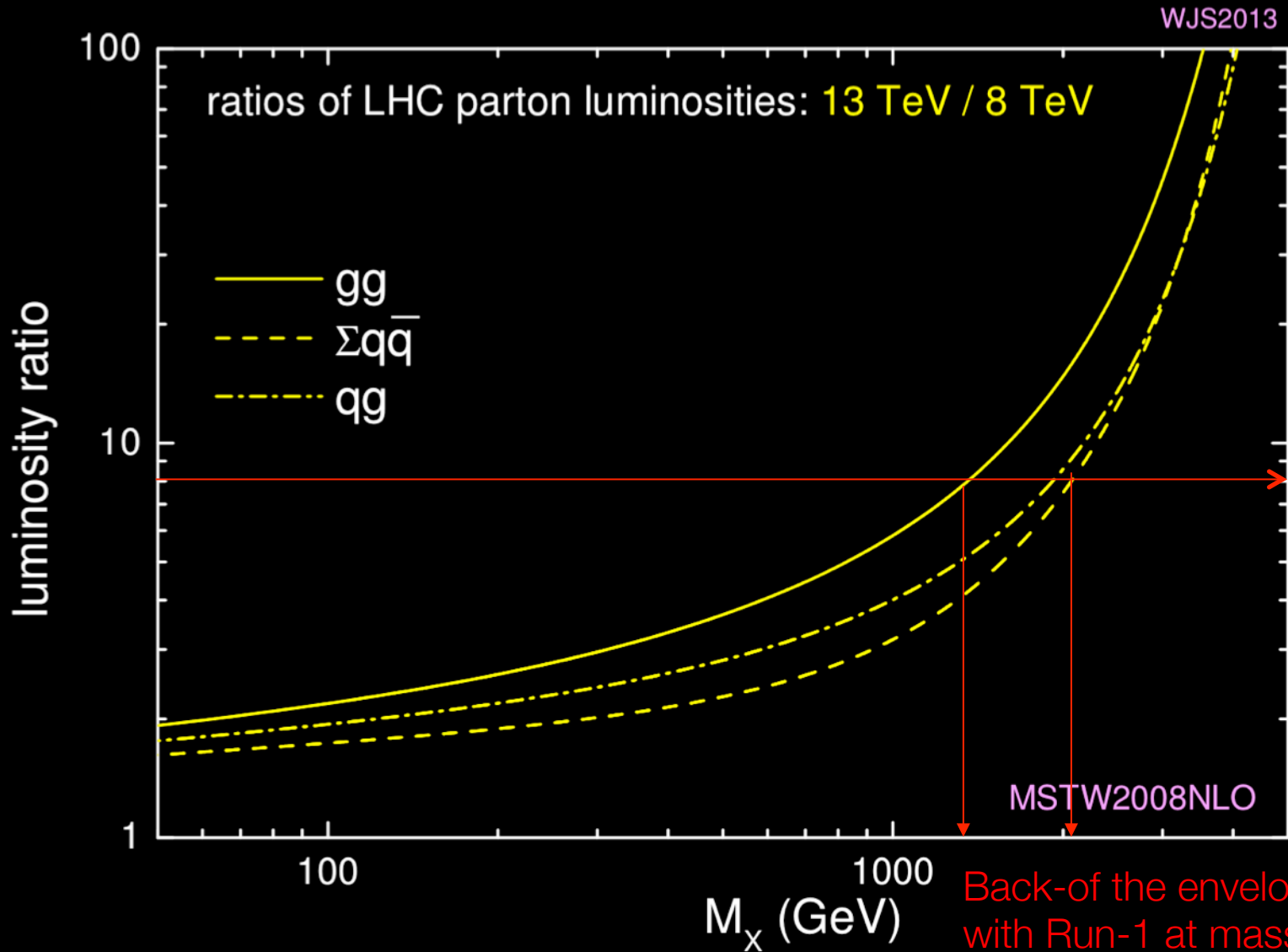


Correlation **NEW**

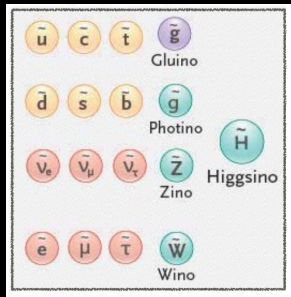
With 2015 data
 NEW turn on 20-40
 GeV earlier than OLD
 → large efficiency
 Increase for Dark Matter

The physics roadmap to LHC Run-2

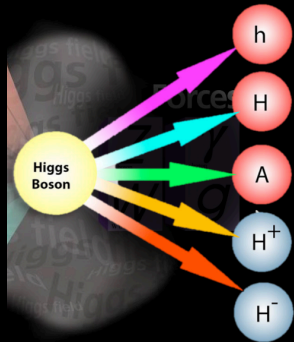
- Increase of LHC parton luminosity with mass m_X



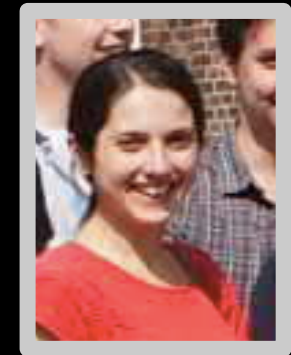
Hot physics topics for Run-2 at 13 TeV



- Evidence for **Supersymmetric particles**



- Non-standard **Higgs sector**
(Heavy Higgs partners, & non-SM h(125) properties)



- Particle evidence for **Dark Matter**

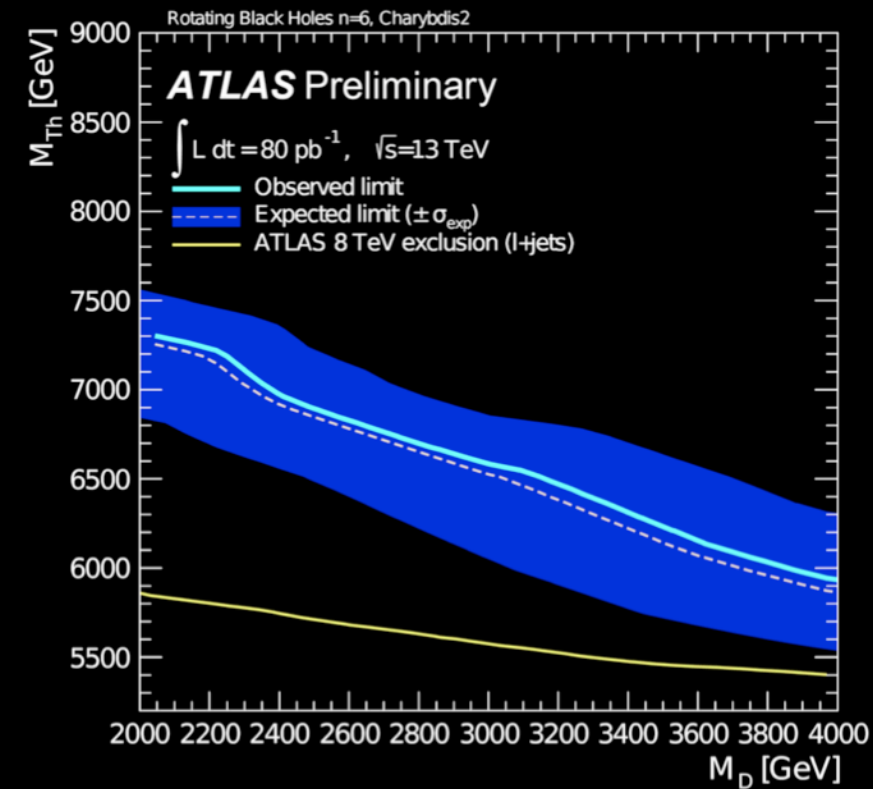
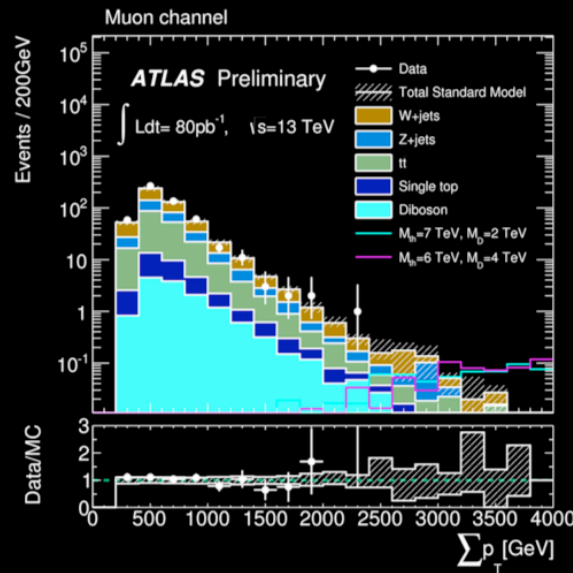
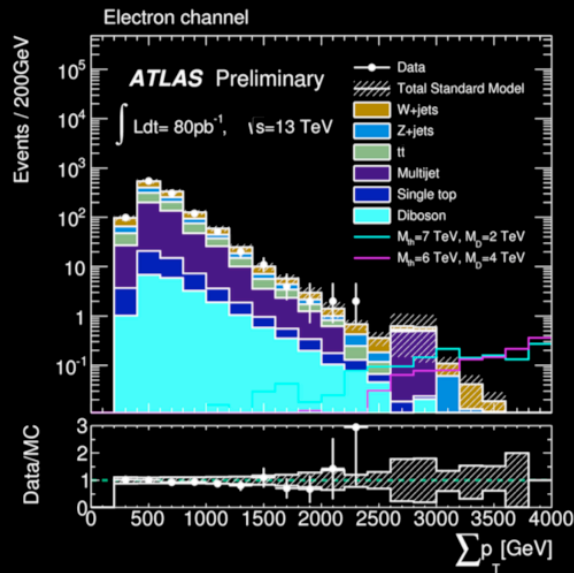


- **Exotic scenarios**
(LFV, Black Holes etc...)

Search for Quantum Black Holes in l+jets channel

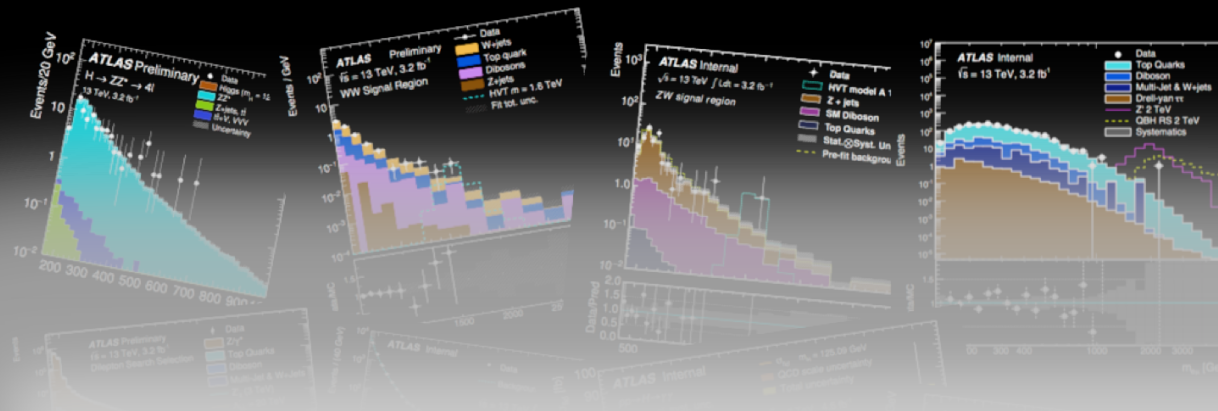
- Already performed in September on 80 pb^{-1} of data

Sarah

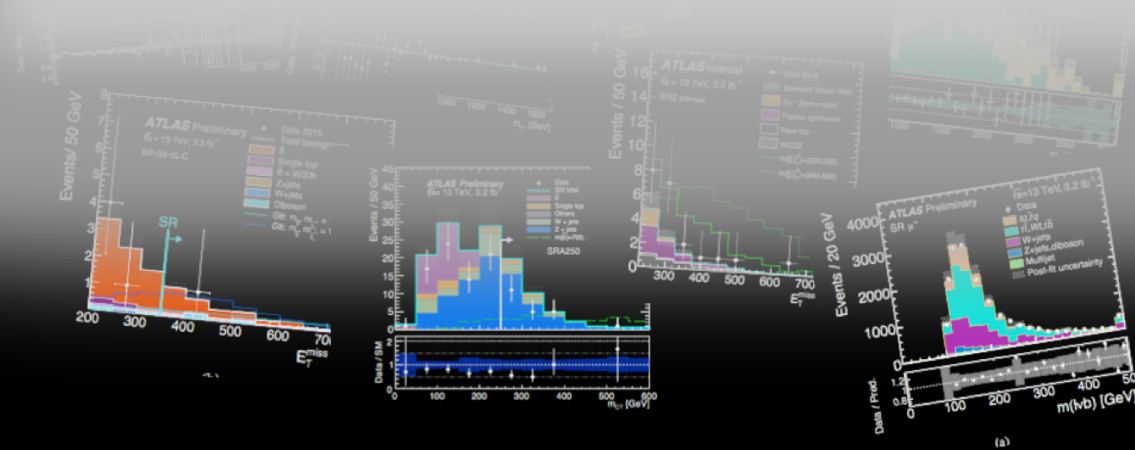


2 papers on QBH searches in dijet, multijet final states already arXiv.

A wealth of new physics results on full Run-2 data [3.2 fb⁻¹]

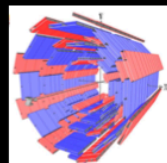


About 20 CONF notes on SUSY, Exotics, Higgs, top physics

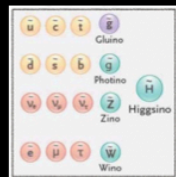


Outlook

- ATLAS detector, computing & physics analysis chain is working very efficiently.
- Eagerly looking forward to much more 13TeV data in 2016



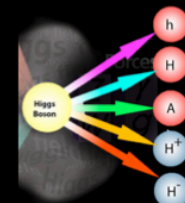
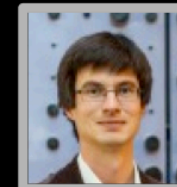
- ATLAS Detector & upgrade



- Non-standard Higgs sector
(Heavy Higgs partners, & non-SM h(125) properties)



- Particle evidence for Dark Matter



- Evidence for Supersymmetric particles

