



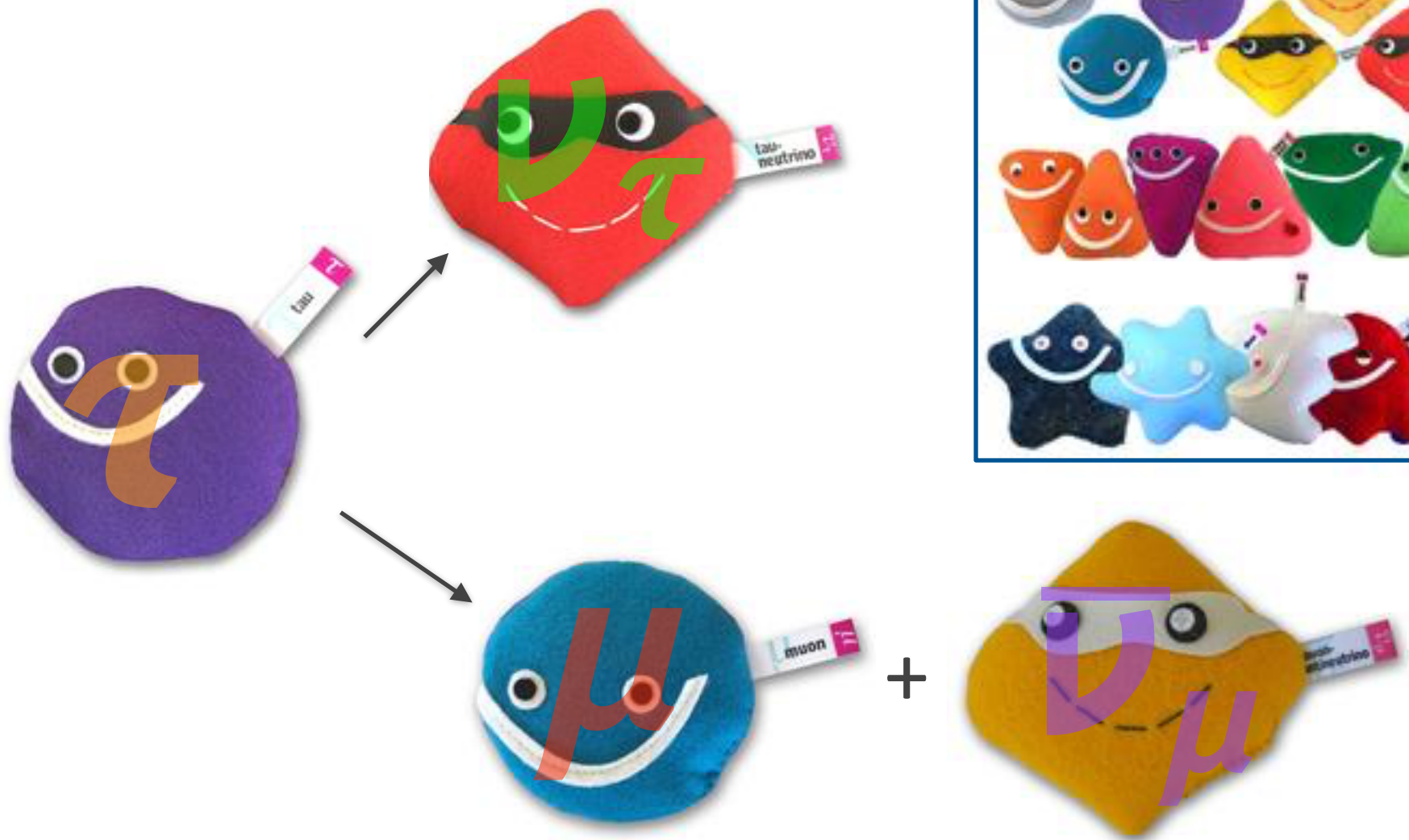
Search for Lepton Flavour Violation

Marcus M. Morgenstern

Nikhef Jamboree
December 11th, 2017



What does the Standard Model tell us?



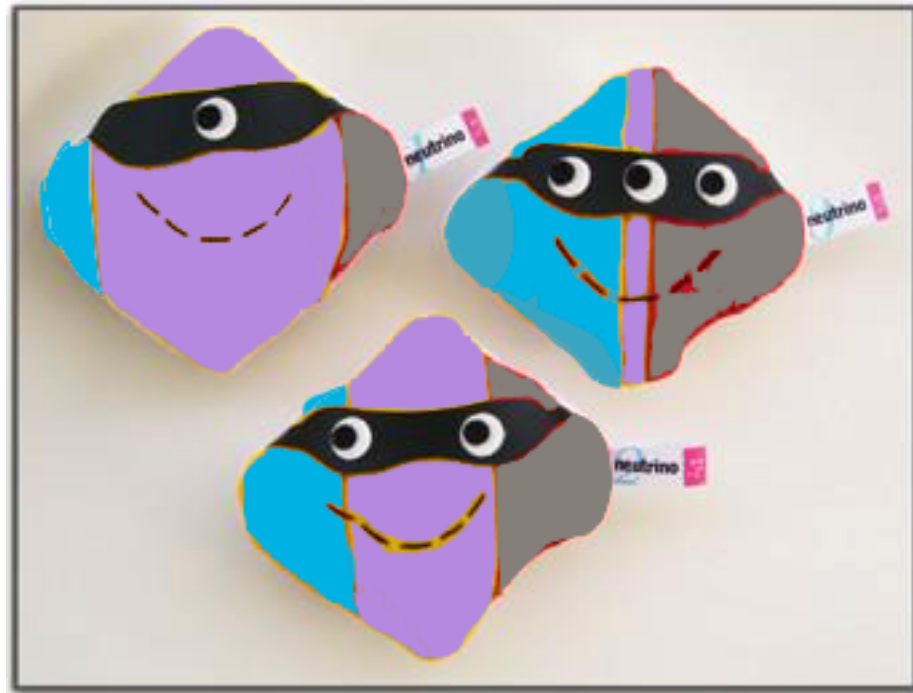
Why should we think about Lepton Flavour Violation?



A long road to Nobel...

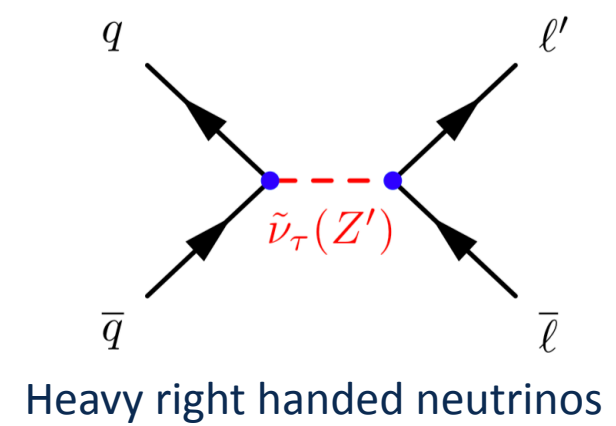
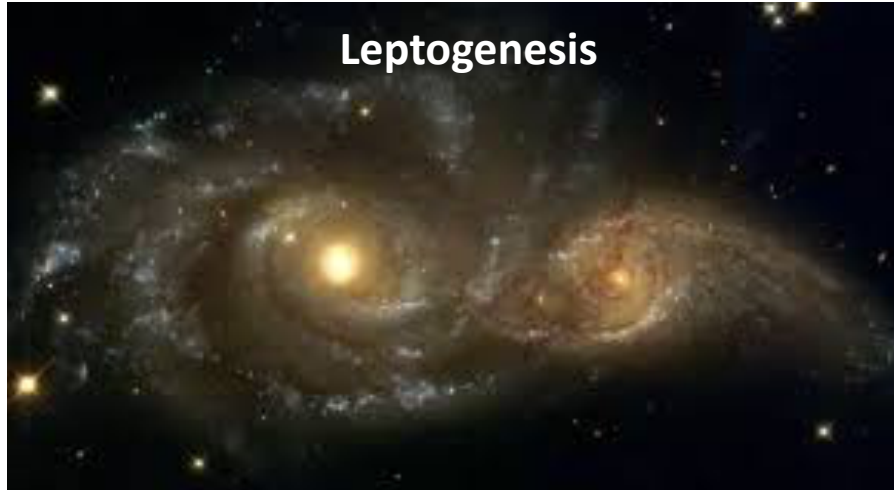
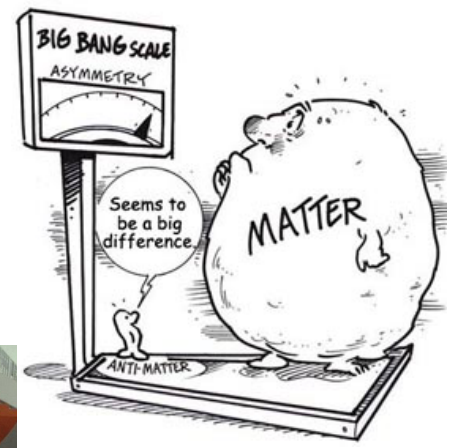


What about charged Lepton Flavour Violation?



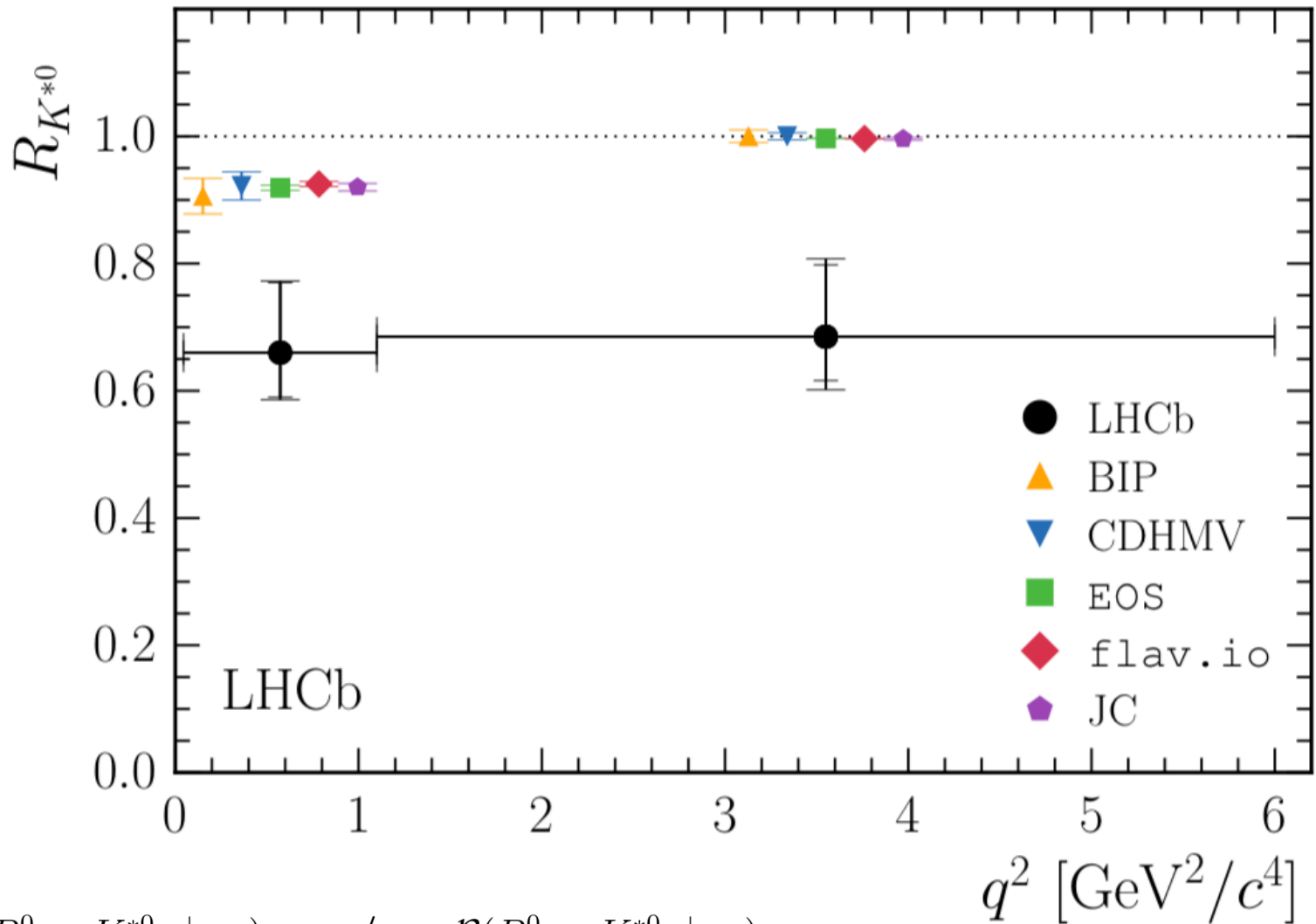
Is there any theoretical motivation? 🤔

Matter-anti-matter asymmetry

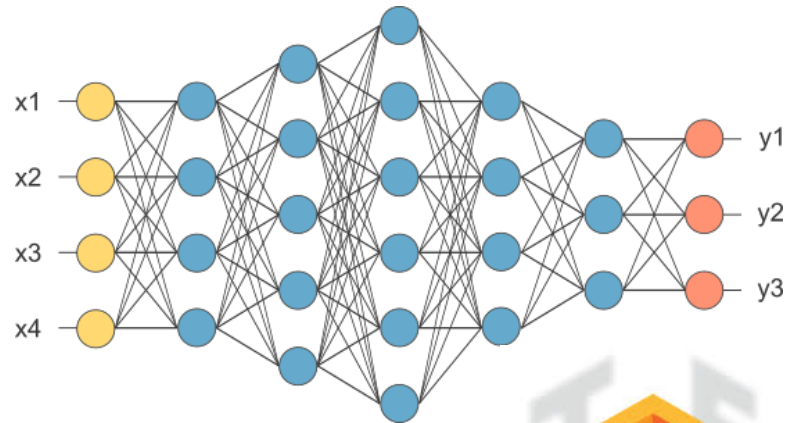
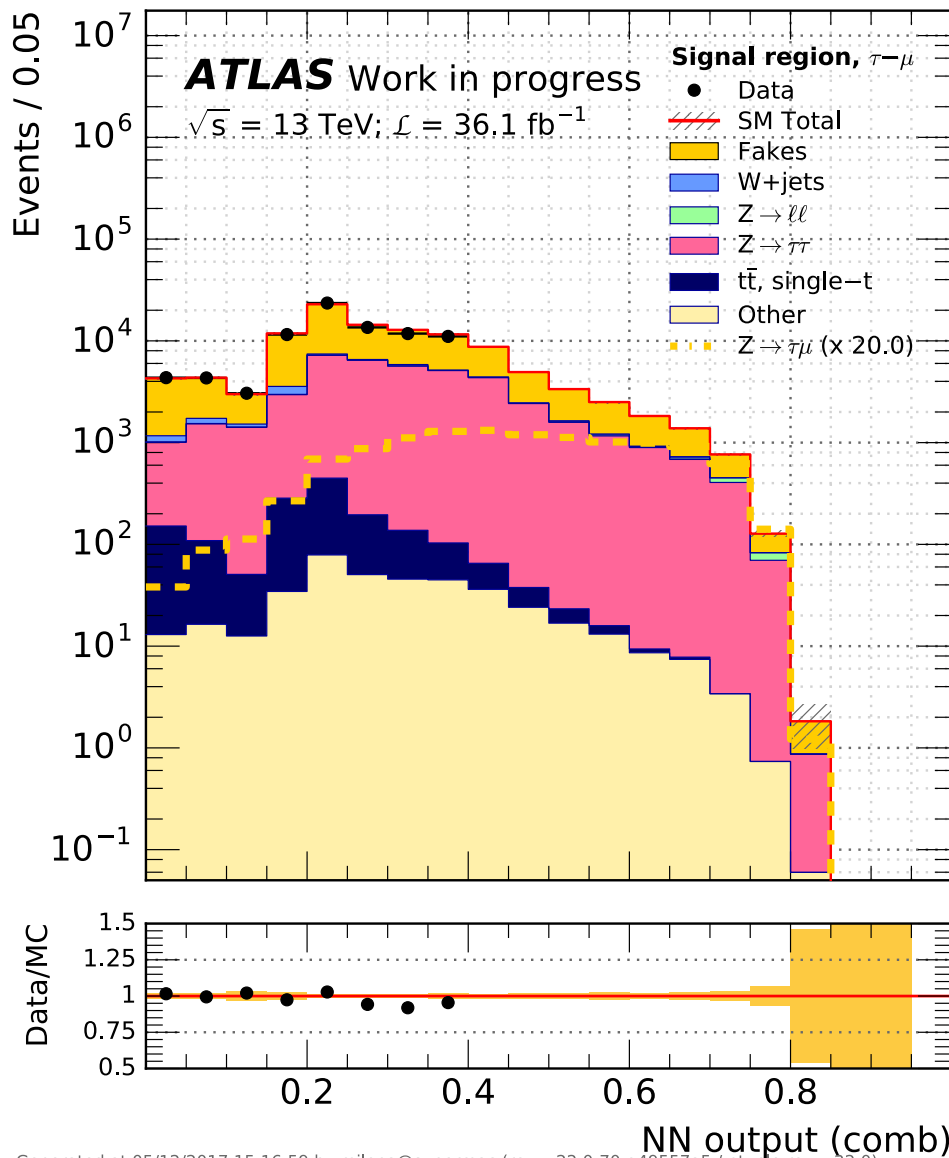


Do we have any hints for Lepton Flavour Violation?

[1705.05802](https://arxiv.org/abs/1705.05802)



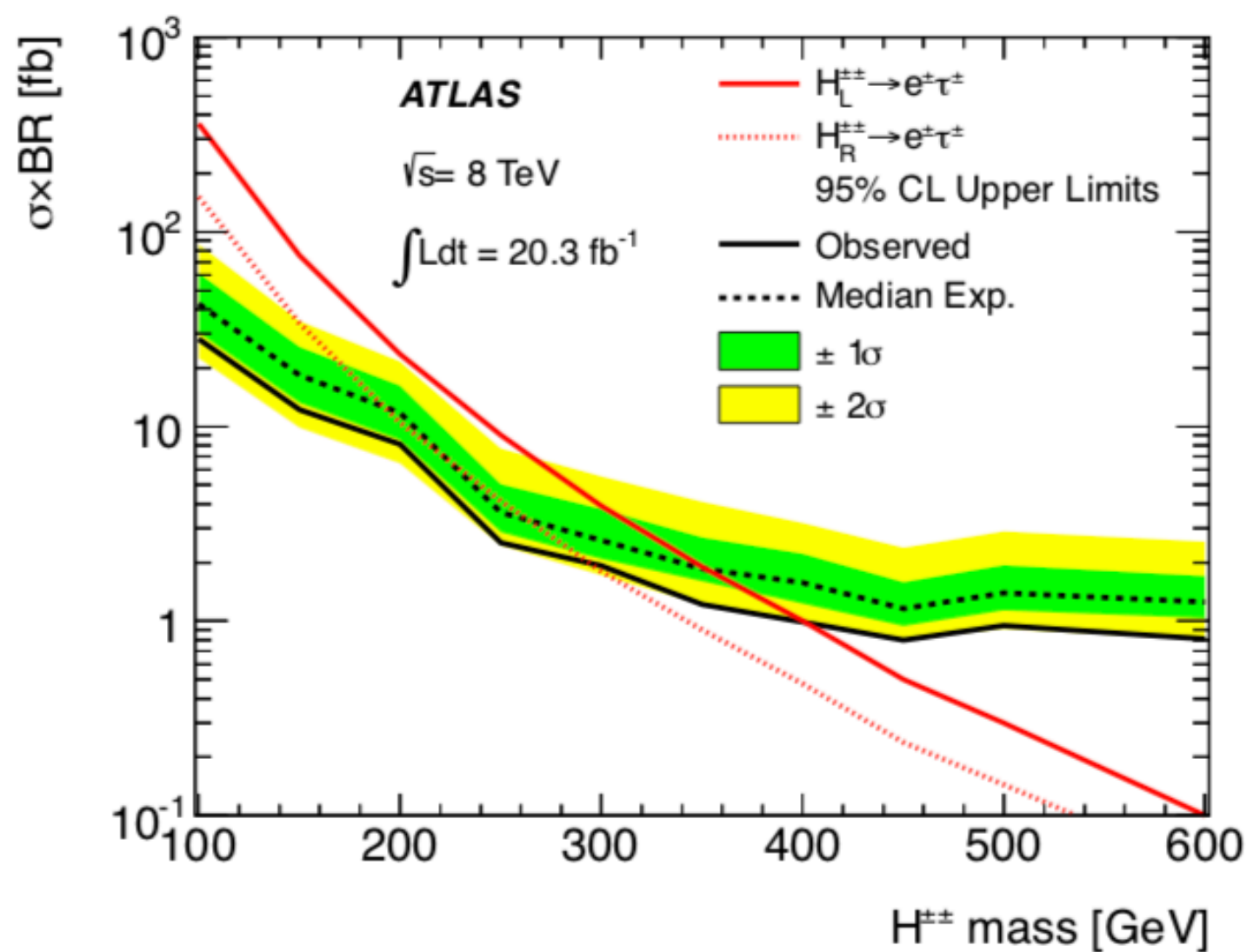
$$R_{K^{*0}} = \frac{\mathcal{B}(B^0 \rightarrow K^{*0} \mu^+ \mu^-)}{\mathcal{B}(B^0 \rightarrow K^{*0} J/\psi (\rightarrow \mu^+ \mu^-))} \bigg/ \frac{\mathcal{B}(B^0 \rightarrow K^{*0} e^+ e^-)}{\mathcal{B}(B^0 \rightarrow K^{*0} J/\psi (\rightarrow e^+ e^-))}$$

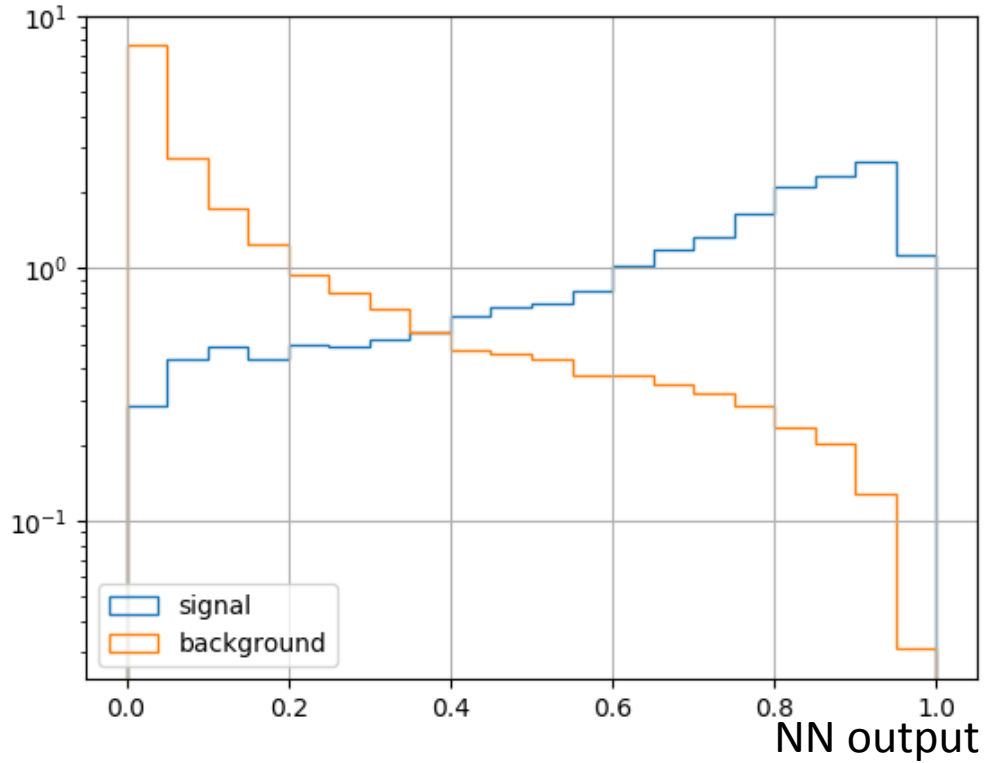
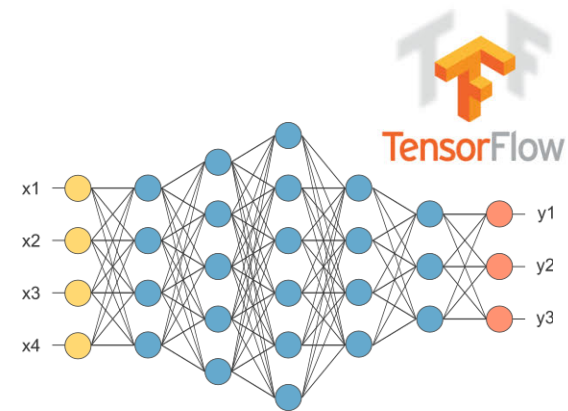
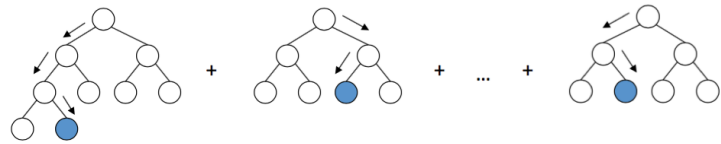
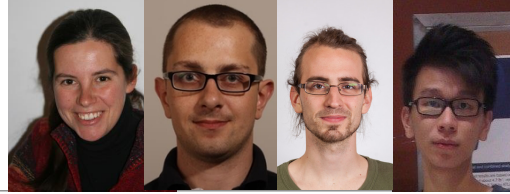


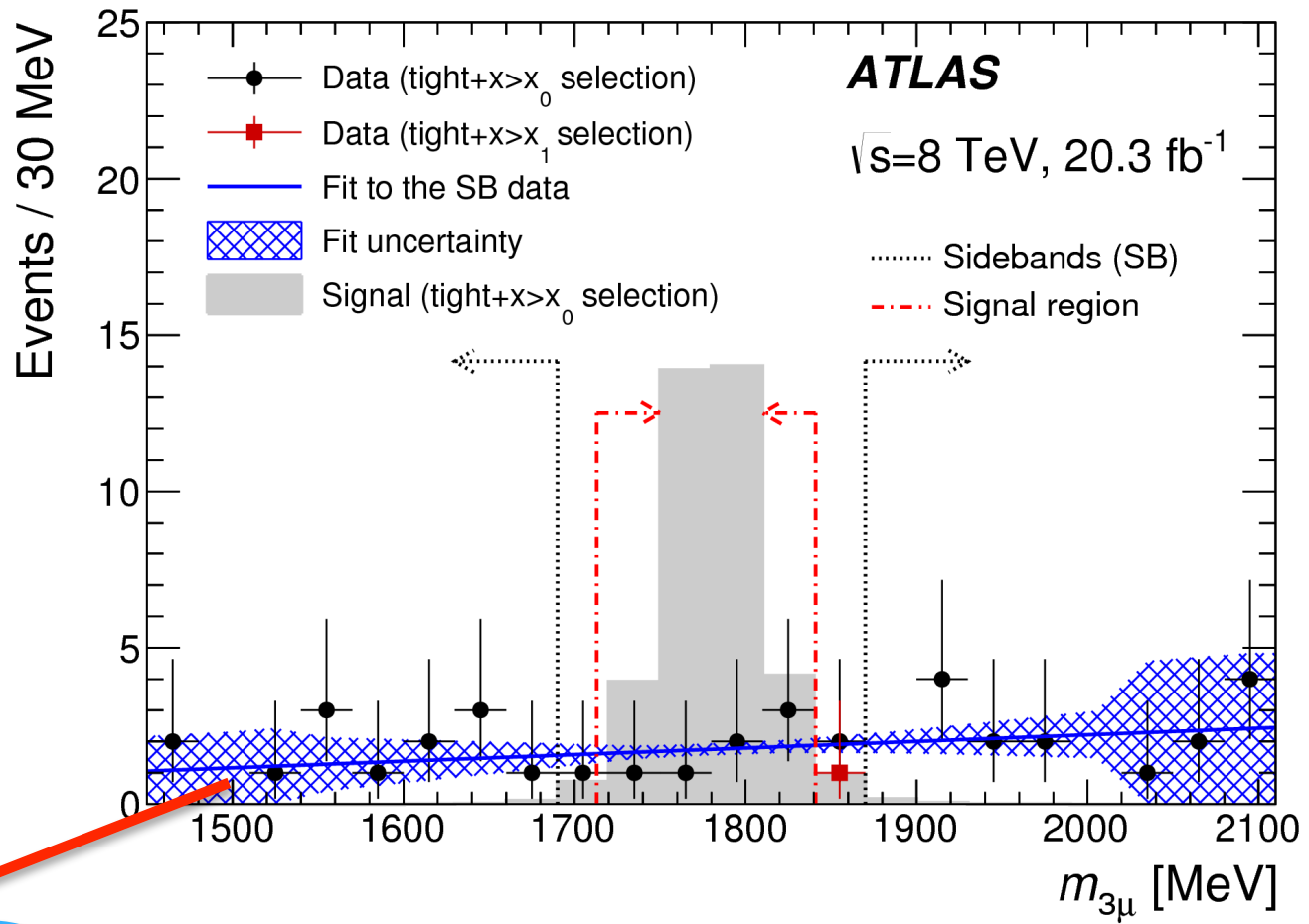
Nik|hef



Niels Bohr Institutet







$$\text{Br}(\tau \rightarrow 3\mu) = \frac{N_s^{\text{UL}} / \mathcal{A}_s \times \epsilon_s}{N_{W \rightarrow \nu\tau}}$$

From signal MC (pointing to N_s^{UL})
 Rescaled 7 TeV measurement (pointing to $N_{W \rightarrow \nu\tau}$)

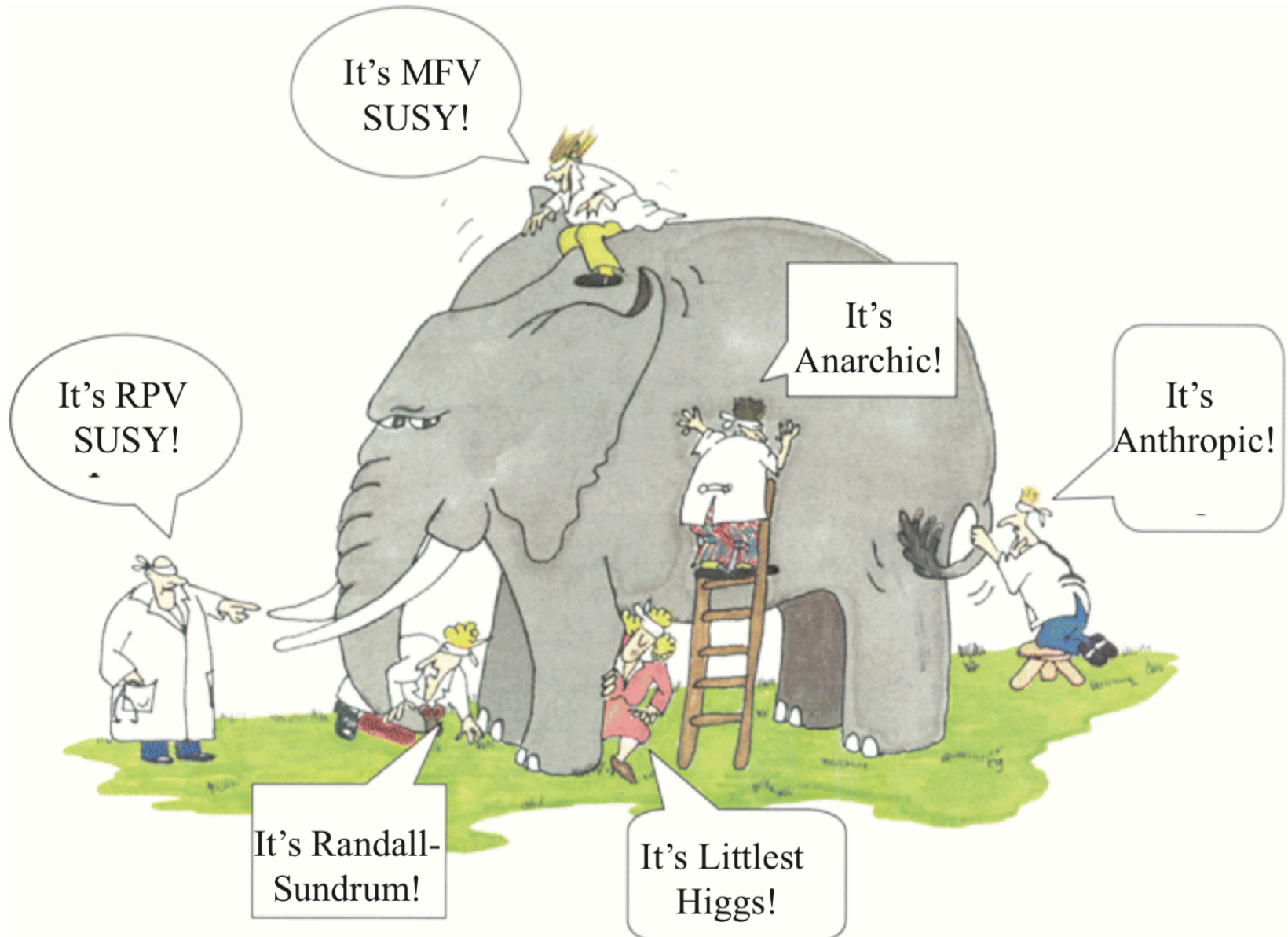
$$\text{BR}(\tau \rightarrow 3\mu) = 3.7 * 10^{-7}$$



COMING SOON



What if we observe Lepton Flavour violating decays?



Summary & Outlook

Nikhef jamboree

chaired by Charles Timmermans, Dorothea Samtleben

from Monday, 11 December 2017 at **08:00** to Tuesday, 12 December 2017 at **18:00** (Europe/Amsterdam)
at **Pakhuis De Zwijger**

Participants Dorothea Samtleben; Eveline Schram - Post

[Go to day](#) ▾

Monday, 11 December ~~2017~~ **2018**

10:00 - 10:30 Arrival

10:30 - 10:40 Opening

10:40 - 11:30 KM3NeT

10:40 **Introduction 15'**

Speaker: Paul de Jong

Material: [Slides](#) 

10:55 **KM3NeT construction: status and plans 20'**

Speaker: Ronald Bruijn

11:15 **KM3NeT in-situ calibration 15'**

Speaker: Karel Melis

11:30 - 12:00 Jan Kluyverprijs

12:00 - 13:15 Lunch

13:15 - 14:30 ATLAS

13:15 **Introduction & Overview 15'**

Speaker: Wouter Verkerke (Nikhef)

13:30 **Upgrade activities 15'**

Speaker: Marcel Vreeswijk

13:45 **CP violation in Higgs production 15'**

Speaker: Remco Castelijm

14:00 **Higgs production in association with dark matter 15'**

Speaker: Veronica Fabiani

14:15 ~~Charged Lepton Flavor Violation 15'~~

Speaker: Marcus Morgenstern

Observation of charged lepton violation