

$E = mc^2$ in action

 $\bullet \bullet \bullet$

Creating matter from light at the LHC

Savannah Clawson

A bit about me

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- Supervised by Profs Brian Cox and Andy Pilkington









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- Twitter (in)famous



Dressed as my supervisor's feedback on my PhD thesis for Halloween because nothing is scarier than reality 101101101

#phdlife #phdchat #phdmemes



10:59 AM · Oct 31, 2022

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savannah clawson thesis

The Tab

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PhD Student Uses Lecturer's Bad Comments on Her ...

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Savannah turned some rather disappointing thesis feedback

31 Oct 2022 - Halloween, Savannah Clawson, PhD thesis, supervisor's bad remarks. University of Manchester She rocked her supervisor's remarks-themed

Tuko News https://www.tuko.co.ke > People

PhD Student Scribes Lecturer's Bad Comments on Her

1 Nov 2022 - Halloween, Savannah Clawson, PhD thesis, supervisor's bad remarks, University of Manchester She rocked her supervisor's remarks-themed

ukdailv.news https://ukdaily.news> News

Meet the Manchester PhD student who dressed up as his ...

31 Oct 2022 - Savannah Clawson, a graduate student in experimental particle physics ... including "Argh! this is tragic" and "a thesis is no brainwash" in ...

The Large Hadron Photon Collider..?



Protons have an electric field

Speed = 0 ms^{-1}



At ultra-relativistic speeds, the field is highly compressed along the direction of motion

Speed \approx c

We can model this boosted field as a source of coherent high energy photons



This model is called the Equivalent Photon Approximation (EPA)

Leading to high energy photon collisions at the LHC!



And (often) leaving the protons unscathed



We can detect these "forward" protons with dedicated spectrometers



With lots of interesting physics potential





Exclusive jets Trzebinski et al 1503.00699



Leptons CMS 1803.04496 ATLAS 2009.14537



W bosons Tizchang & Etesami 2004.12203 Baldenegro et al 2009.08331



Top quarks Goncalves et al 2007.04565 Howarth 2008.04249



Axion-like particles Fichet et al 1312.5153 Baldenegro et al 1803.10835



Higgs boson Cox et al 0709.3035 Heinemeyer et al 0708.3052



SUSY dark matter

Beresford & JL 1811.06465 Harland-Lang et al 1812.04886

Important probes of nonperturbative QCD & electroweak scale Interesting searches for physics beyond the Standard Model



My favourite plot event display

-2

0

z [mm]



-10

-6



Questions?

Find out more about me and my work:



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