

## NIP-UPD CERN-ATLAS Annual Report 2021

**NIP-UPD CERN-ATLAS Team Leader:** Marvin M. Flores

### **High Energy Physics Subgroup Members (11 students total)**

#### PhD

Alvarez, Justin (defended his MS Thesis in Stealth Supersymmetry last June 2021)

Nuñez, Kimver (from Dr. Esguerra)

#### MS

Apolinario, Lance

Calunsag, Don Ver

Cantong, Jonelle

Labtic, Adrian (currently on LOA)

Rabang, Nicko Angelo

Rex, Jaren Ryan

#### Undergrad

De Guzman, Joaquin Lorenzo

Jacomilla, Demi

Mendoza, Chris Andrew

### **Highlights In 2021**

- In February 2021, NIP-UPD has been accepted as an ATLAS Member being an Associate Institute to the University of the Witwatersrand, South Africa. An MOU between NIP-UPD and ATLAS was made and an MOA is in the works.
- Dr. Flores finished his ATLAS Qualification Task last April 2021 and is now part of the official ATLAS Author List.
- Adrian Patrick Labtic was accepted in the CERN Summer School 2021 (held online only) and made a study of large jet multiplicities in stop decays. Report available here: <https://cds.cern.ch/record/2779584/files/Summer%20School%20Project%20Report.pdf>
- Justin Alvarez has been inducted as a member of the ATLAS Collaboration (PhD Student, non-author) and was able to participate the week-long ATLAS Induction Workshop (held online only) last Oct. 29 to Nov. 5, 2021.

## Current Issues

- As part of the ATLAS Collaboration, we have a financial obligation to pay:
  - (1) authorship fee of 8,000 CHF (~**430,000 pesos**) per author per year (currently we only have 1 Filipino ATLAS author from the Philippines)
  - (2) TDAQ (Trigger & Data Acquisition) Systems contribution of 3,000 CHF (~**160,000 pesos**) per year
  - (3) Upgrade contribution of 1,400 CHF (~**75,000 pesos**) per year until 2025

Chancellor Nemenzo has pledged to cover the 2021 contributions from a special fund since ATLAS expects the 2021 contribution on or before **August 31st 2022**.

- ATLAS requires a passport for a valid ID (and nothing else) in order to be officially part of the collaboration. Students who are interested can't be process since it is so hard to apply/renew passports right now (applying for an appointment slot in DFA is extremely difficult during the pandemic)
- The subgroup is divided into two – those who want to pursue particle physics within ATLAS and without. This is because some students have made explicit request to do particle physics (e.g., phenomenology) while not being tied to the ATLAS Collaboration. In other words, not every member of the group is guaranteed to follow the “ATLAS route”.
- In order to accommodate members of the Collaboration from both west (e.g., US) and east (e.g., Asian countries), the ATLAS Collaboration holds their meetings and talks in the afternoon (EU Time) which means night time in the Philippines. There are meetings that can go all the way up to midnight.

## **List of ATLAS publications as of 2021**

1. Aaboud, M., Aad, G., Abbott, B., Abbott, D. C., Abdinov, O., Abed Abud, A., ... Zwalinski, L. (2021). Measurement of the relative  $B_{c^\pm}/B_{\pm}$  production cross section with the ATLAS detector at  $\sqrt{s}=8$  TeV. *Physical Review D*, 104(1), Article number 012010. <https://doi.org/10.1103/PhysRevD.104.012010>
2. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., & Abeling, K. (2021). Measurement of the  $t\bar{t}t\bar{t}$  production cross section in pp collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector. *Journal of High Energy Physics*, 2021(11), Article number 118. [https://doi.org/10.1007/JHEP11\(2021\)118](https://doi.org/10.1007/JHEP11(2021)118)
3. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., & Abeling, K. (2021). Search for dark matter in events with missing transverse momentum and a Higgs boson decaying into two photons in pp collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector. *Journal of High Energy Physics*, 2021(10), Article number 13. [https://doi.org/10.1007/JHEP10\(2021\)013](https://doi.org/10.1007/JHEP10(2021)013)
4. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Two-particle azimuthal correlations in photonuclear ultraperipheral Pb+Pb collisions at 5.02 TeV with ATLAS. *Physical Review C*, 104(1), Article number 014903. <https://doi.org/10.1103/PhysRevC.104.014903>
5. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Measurements of  $W+W\rightarrow\geq 1$  jet production cross-sections in pp collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector. *Journal of High Energy Physics*, 2021(6), Article Number 3. [https://doi.org/10.1007/JHEP06\(2021\)003](https://doi.org/10.1007/JHEP06(2021)003)
6. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Evidence for Higgs boson decays to a low-mass dilepton system and a photon in pp collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector. *Physics Letters B*, 819, Article Number 136412. <https://doi.org/10.1016/j.physletb.2021.136412>
7. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). A search for the decays of stopped long-lived particles at  $\sqrt{s}=13$  TeV with the ATLAS detector. *Journal of High Energy Physics*, 2021(7). Article no. 173. [https://doi.org/10.1007/JHEP07\(2021\)173](https://doi.org/10.1007/JHEP07(2021)173)
8. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Search for pair production of third-generation scalar leptoquarks decaying into a top quark and a  $\tau$ -lepton in pp collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector. *Journal of High Energy Physics*, 2021(6). Article no. 179. [https://doi.org/10.1007/JHEP06\(2021\)179](https://doi.org/10.1007/JHEP06(2021)179)

9. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Search for trilepton resonances from chargino and neutralino pair production in  $s = 13$  TeV  $pp$  collisions with the ATLAS detector. *Physical Review D*, 103(11), Article 112003. <https://doi.org/10.1103/physrevd.103.112003>
10. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Search for supersymmetry in events with four or more charged leptons in  $139 \text{ fb}^{-1}$  of  $\sqrt{s} = 13$  TeV  $pp$  collisions with the ATLAS detector. *Journal of High Energy Physics*, 2021(7), Article number 167. [https://doi.org/10.1007/JHEP07\(2021\)167](https://doi.org/10.1007/JHEP07(2021)167)
11. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Search for bottom-squark pair production in  $pp$  collision events at  $s = 13$  TeV with hadronically decaying  $\tau$ -leptons,  $b$ -jets, and missing transverse momentum using the ATLAS detector. *Physical Review D*, 104(3), Article number 032014. <https://doi.org/10.1103/PhysRevD.104.032014>
12. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Search for new phenomena in events with an energetic jet and missing transverse momentum in  $pp$  collisions at  $s = 13$  TeV with the ATLAS detector. *Physical Review D*, 103(11), Article number 112006. <https://doi.org/10.1103/PhysRevD.103.112006>
13. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Search for New Phenomena in Final States with Two Leptons and One or No  $b$ -Tagged Jets at  $s = 13$  TeV Using the ATLAS Detector. *Physical Review Letters*, 127(14), Article number 141801. <https://doi.org/10.1103/PhysRevLett.127.141801>
14. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abeling, K., & Abhayasinghe, D. K. (2021). Measurement of the production cross section of pairs of isolated photons in  $pp$  collisions at 13 TeV with the ATLAS detector. *Journal of High Energy Physics*, 2021(11), Article number 169. [https://doi.org/10.1007/JHEP11\(2021\)169](https://doi.org/10.1007/JHEP11(2021)169)
15. Aad, G., Abbott, B., Abbott, D. C., Abed Abud, A., Abelling, K., & Abhayasinghe, D. K. (2021). Search for new phenomena in final states with  $b$ -jets and missing transverse momentum in  $\sqrt{s} = 13$  TeV  $pp$  collisions with the ATLAS detector. *Journal of High Energy Physics*, 2021(5), Article number 93. [https://doi.org/10.1007/JHEP05\(2021\)093](https://doi.org/10.1007/JHEP05(2021)093)
16. Aad, G., Abbott, B., Abbott, D. C., Abud, A. A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Optimisation of large-radius jet reconstruction for the ATLAS detector in 13 TeV proton–proton collisions. *The European Physical Journal C*, 81(4), Article number 334. <https://doi.org/10.1140/epjc/s10052-021-09054-3>

17. Aad, G., Abbott, B., Abbott, D. C., Abud, A. A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Muon reconstruction and identification efficiency in ATLAS using the full Run 2 pp collision data set at data set at  $\sqrt{s}=13$  TeV. The European Physical Journal C, 81(7), Article Number 578. <https://doi.org/10.1140/epjc/s10052-021-09233-2>
18. Aad, G., Abbott, B., Abbott, D. C., Abud, A. A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Measurements of the inclusive and differential production cross sections of a top-quark–antiquark pair in association with a Z boson at  $\sqrt{s}=13$  TeV with the ATLAS detector. The European Physical Journal C, 81(8), Article number 737. <https://doi.org/10.1140/epjc/s10052-021-09439-4>
19. Aad, G., Abbott, B., Abbott, D. C., Abud, A. A., Abeling, K., Abhayasinghe, D. K., ... Zwalinski, L. (2021). Search for R-parity-violating supersymmetry in a final state containing leptons and many jets with the ATLAS experiment using  $\sqrt{s}=13$ TeV proton–proton collision data. The European Physical Journal C, 81, Article number: 1023. <https://doi.org/10.1140/epjc/s10052-021-09761-x>
20. Aad, G., Abbott, B., Abud, A. A., Abeling, K., & Abhayasinghe, D. K. (2021). Measurements of Higgs Bosons Decaying to Bottom Quarks from Vector Boson Fusion Production with the ATLAS Experiment at  $\sqrt{s}=13$  TeV. The European Physical Journal C, 81(6), Article number 537. <https://doi.org/10.1140/epjc/s10052-021-09192-8>
21. Aad, G., Abbott, B., Abbott, D. C., Abud, A. A., & Abeling, K. (2021). Measurements of sensor radiation damage in the ATLAS inner detector using leakage currents. Journal of Instrumentation, 16(8), Article Number P08025. <https://iopscience.iop.org/article/10.1088/1748-0221/16/08/P08025>
22. ATLAS Collaboration. (2021). Configuration and performance of the ATLAS b-jet triggers in Run 2. The European Physical Journal C, 81(12), Article number 1087. <https://doi.org/10.1140/epjc/s10052-021-09775-5>
23. ATLAS Collaboration. (2021). Search for exotic decays of the Higgs boson to long-lived particles in pp collisions at  $\sqrt{s}=13$ TeV using displaced vertices in the ATLAS inner detector. Journal of High Energy Physics, 2021 (11), Article Number 229. Retrieved from [https://doi.org/10.1007/JHEP11\(2021\)229](https://doi.org/10.1007/JHEP11(2021)229)

## Photos/Screenshots

### ATLAS Collaboration MAP before and after Philippine membership



**Caption:** ATLAS member countries are shaded blue. Click on country for summary information (double-click to zoom). Orange markers indicate ATLAS institutes (click for information, double-click for zoom). Use mouse wheel or buttons to zoom (click on ocean or non-member area to jump back to world view).



**Caption:** ATLAS member countries are shaded blue. Click on country for summary information (double-click to zoom). Orange markers indicate ATLAS institutes (click for information, double-click for zoom). Use mouse wheel or buttons to zoom (click on ocean or non-member area to jump back to world view).

---

NIP, UPD, and the Philippines affiliation in a sample ATLAS Paper  
(<https://journals.aps.org/prd/abstract/10.1103/PhysRevD.105.092012>)

<sup>27f</sup>West University in Timisoara, Timisoara, Romania

<sup>28a</sup>Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, Slovak Republic

<sup>28b</sup>Department of Subnuclear Physics, Institute of Experimental Physics of the Slovak Academy of Sciences, Kosice, Slovak Republic

<sup>29</sup>Physics Department, Brookhaven National Laboratory, Upton, New York, USA

<sup>30</sup>Departamento de Física (FCEN) and IFIBA, Universidad de Buenos Aires and CONICET, Buenos Aires, Argentina

<sup>31</sup>California State University, California, USA

<sup>32</sup>Cavendish Laboratory, University of Cambridge, Cambridge, United Kingdom

<sup>33a</sup>Department of Physics, University of Cape Town, Cape Town, South Africa

<sup>33b</sup>iThemba Labs, Western Cape, South Africa

<sup>33c</sup>Department of Mechanical Engineering Science, University of Johannesburg, Johannesburg, South Africa

<sup>33d</sup>National Institute of Physics, University of the Philippines Diliman (Philippines), Philippines

<sup>33e</sup>University of South Africa, Department of Physics, Pretoria, South Africa

<sup>33f</sup>University of Zululand, KwaDlangezwa, South Africa

<sup>33g</sup>School of Physics, University of the Witwatersrand, Johannesburg, South Africa

<sup>34</sup>Department of Physics, Carleton University, Ottawa, Ontario, Canada

<sup>35a</sup>Faculté des Sciences Ain Chock, Réseau Universitaire de Physique des Hautes Energies— Université Hassan II, Casablanca, Morocco

<sup>35b</sup>Faculté des Sciences, Université Ibn-Tofail, Kénitra, Morocco

<sup>35c</sup>Faculté des Sciences Semlalia, Université Cadi Ayyad, LPHEA-Marrakech, Morocco

<sup>35d</sup>LPMR, Faculté des Sciences, Université Mohamed Premier, Oujda, Morocco

<sup>35e</sup>Faculté des sciences, Université Mohammed V, Rabat, Morocco

<sup>35f</sup>Mohammed VI Polytechnic University, Ben Guerir, Morocco

<sup>36</sup>CERN, Geneva, Switzerland

<sup>37</sup>Enrico Fermi Institute, University of Chicago, Chicago, Illinois, USA

<sup>38</sup>LPC, Université Clermont Auvergne, CNRS/IN2P3, Clermont-Ferrand, France

<sup>39</sup>Nevis Laboratory, Columbia University, Irvington, New York, USA

<sup>40</sup>Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark

<sup>41a</sup>Dipartimento di Fisica, Università della Calabria, Rende, Italy

<sup>41b</sup>INFN Gruppo Collegato di Cosenza, Laboratori Nazionali di Frascati, Italy

<sup>42</sup>Physics Department, Southern Methodist University, Dallas, Texas, USA

<sup>43</sup>Physics Department, University of Texas at Dallas, Richardson, Texas, USA



Dr. Flores among the other 3000+ ATLAS Authors from different institutions around the world

J. Erdmann<sup>47</sup>, A. Ereditato<sup>19</sup>, P.A. Erland<sup>84</sup>, M. Errenst<sup>178</sup>, M. Escalier<sup>64</sup>, C. Escobar<sup>170</sup>, E. Etzion<sup>158</sup>, G. Evans<sup>137a</sup>, H. Evans<sup>65</sup>, M.O. Evans<sup>153</sup>, A. Ezhilov<sup>135</sup>, S. Ezzarqtouni<sup>35a</sup>, F. Fabbri<sup>57</sup>, L. Fabbri<sup>23b,23a</sup>, G. Facini<sup>174</sup>, V. Fadeyev<sup>143</sup>, R.M. Fakhrutdinov<sup>120</sup>, S. Falciano<sup>72a</sup>, P.J. Falke<sup>24</sup>, S. Falke<sup>36</sup>, J. Faltova<sup>140</sup>, Y. Fan<sup>14a</sup>, Y. Fang<sup>14a</sup>, G. Fanourakis<sup>44</sup>, M. Fanti<sup>68a,68b</sup>, M. Faraj<sup>60c</sup>, A. Farbin<sup>8</sup>, A. Farilla<sup>74a</sup>, T. Farooque<sup>105</sup>, S.M. Farrington<sup>50</sup>, F. Fassi<sup>35e</sup>, D. Fassouliotis<sup>9</sup>, M. Faucci Giannelli<sup>73a,73b</sup>, W.J. Fawcett<sup>32</sup>, L. Fayard<sup>64</sup>, O.L. Fedin<sup>135,o</sup>, G. Fedotov<sup>135</sup>, M. Feickert<sup>169</sup>, L. Feligioni<sup>100</sup>, A. Fell<sup>146</sup>, D.E. Fellers<sup>129</sup>, C. Feng<sup>60b</sup>, M. Feng<sup>14b</sup>, M.J. Fenton<sup>167</sup>, A.B. Fenyuk<sup>120</sup>, S.W. Ferguson<sup>43</sup>, J.A. Fernandez Pretel<sup>52</sup>, J. Ferrando<sup>46</sup>, A. Ferrari<sup>168</sup>, P. Ferrari<sup>117</sup>, R. Ferrari<sup>70a</sup>, D. Ferrere<sup>54</sup>, C. Ferretti<sup>104</sup>, F. Fiedler<sup>98</sup>, A. Filipčič<sup>91</sup>, E.K. Filmer<sup>1</sup>, F. Filthaut<sup>116</sup>, M.C.N. Fiolhais<sup>137a,137c,p</sup>, L. Fiorini<sup>170</sup>, F. Fischer<sup>148</sup>, W.C. Fisher<sup>105</sup>, T. Fitschen<sup>20,64</sup>, I. Fleck<sup>148</sup>, P. Fleischmann<sup>104</sup>, T. Flick<sup>178</sup>, L. Flores<sup>134</sup>, M. Flores<sup>33d</sup>, L.R. Flores Castillo<sup>62a</sup>, F.M. Follega<sup>75a,75b</sup>, N. Fomin<sup>16</sup>, J.H. Foo<sup>163</sup>, B.C. Forland<sup>65</sup>, A. Formica<sup>142</sup>, A.C. Forti<sup>99</sup>, E. Fortin<sup>100</sup>, A.W. Fortman<sup>59</sup>, M.G. Foti<sup>17</sup>, L. Fountas<sup>9</sup>, D. Fournier<sup>64</sup>, H. Fox<sup>89</sup>, P. Francavilla<sup>71a,71b</sup>, S. Francescato<sup>59</sup>, M. Franchini<sup>23b,23a</sup>, S. Franchino<sup>61a</sup>, D. Francis<sup>36</sup>, L. Franco<sup>4</sup>, L. Franconi<sup>19</sup>, M. Franklin<sup>59</sup>, G. Frattari<sup>72a,72b</sup>, A.C. Freegard<sup>92</sup>, P.M. Freeman<sup>20</sup>, W.S. Freund<sup>80b</sup>, E.M. Freundlich<sup>47</sup>, D. Froidevaux<sup>36</sup>, J.A. Frost<sup>132</sup>, Y. Fu<sup>60a</sup>, M. Fujimoto<sup>124</sup>, E. Fullana Torregrosa<sup>170</sup>, J. Fuster<sup>170</sup>, A. Gabrielli<sup>23b,23a</sup>, A. Gabrielli<sup>36</sup>, P. Gadow<sup>46</sup>, G. Gagliardi<sup>55b,55a</sup>, L.G. Gagnon<sup>17</sup>, G.E. Gallardo<sup>132</sup>, E.J. Gallas<sup>132</sup>, B.J. Gallop<sup>141</sup>, R. Gamboa Goni<sup>92</sup>, K.K. Gan<sup>125</sup>, S. Ganguly<sup>160</sup>, J. Gao<sup>60a</sup>, Y. Gao<sup>50</sup>, F.M. Garay Walls<sup>144a,144b</sup>, B. Garcia<sup>29</sup>, C. García<sup>170</sup>, J.E. García Navarro<sup>170</sup>, J.A. García Pascual<sup>14a</sup>, M. Garcia-Sciveres<sup>17</sup>, R.W. Gardner<sup>37</sup>, D. Garg<sup>77</sup>, R.B. Garg<sup>150</sup>, S. Gargiulo<sup>52</sup>, C.A. Garner<sup>163</sup>, V. Garonne<sup>29</sup>, S.J. Gasiorowski<sup>145</sup>, P. Gaspar<sup>80b</sup>, G. Gaudio<sup>70a</sup>, P. Gauzzi<sup>72a,72b</sup>, I.L. Gavrilenko<sup>109</sup>, A. Gavrilyuk<sup>121</sup>, C. Gay<sup>171</sup>, G. Gaycken<sup>46</sup>, E.N. Gazis<sup>10</sup>, A.A. Geanta<sup>27b</sup>, C.M. Gee<sup>143</sup>, J. Geisen<sup>96</sup>, M. Geisen<sup>98</sup>, C. Gemme<sup>55b</sup>, M.H. Genest<sup>58</sup>, S. Gentile<sup>72a,72b</sup>, S. George<sup>93</sup>, W.F. George<sup>20</sup>, T. Gerialis<sup>44</sup>, L.O. Gerlach<sup>53</sup>, P. Gessinger-Befurt<sup>36</sup>, M. Ghasemi Bostanabad<sup>172</sup>, A. Ghosal<sup>148</sup>, A. Ghosh<sup>167</sup>, A. Ghosh<sup>7</sup>, B. Giacobbe<sup>23b</sup>, S. Giagu<sup>72a,72b</sup>, N. Giangiacomini<sup>163</sup>, P. Giannetti<sup>71a</sup>, A. Giannini<sup>60a</sup>, S.M. Gibson<sup>93</sup>, M. Gignac<sup>143</sup>, D.T. Gil<sup>83b</sup>, B.J. Gilbert<sup>39</sup>, D. Gillberg<sup>34</sup>, G. Gilles<sup>117</sup>, N.E.K. Gillwald<sup>46</sup>, L. Ginabat<sup>133</sup>, D.M. Gingrich<sup>2,e</sup>, M.P. Giordani<sup>66a,66c</sup>, P.F. Giraud<sup>142</sup>, G. Giugliarelli<sup>66a,66c</sup>, D. Giugni<sup>68a</sup>, F. Giuli<sup>73a,73b</sup>, I. Gkialas<sup>9,q</sup>, P. Gkoutoumis<sup>10</sup>, L.K. Gladilin<sup>111</sup>, C. Glasman<sup>97</sup>, G.R. Gledhill<sup>129</sup>, M. Glisic<sup>129</sup>, I. Gnesi<sup>41b,r</sup>, Y. Go<sup>29</sup>, M. Goblirsch-Kolb<sup>26</sup>, D. Godin<sup>108</sup>, S. Goldfarb<sup>103</sup>, T. Golling<sup>54</sup>, M.G.D. Gololo<sup>33g</sup>, D. Golubkov<sup>120</sup>, J.P. Gombas<sup>105</sup>, A. Gomes<sup>137a,137b</sup>, A.J. Gomez Delegido<sup>170</sup>, R. Goncalves Gama<sup>53</sup>, R. Gonçalo<sup>137a,137c</sup>, G. Gonella<sup>129</sup>, L. Gonella<sup>20</sup>, A. Gongadze<sup>79</sup>, F. Gonnella<sup>20</sup>, J.L. Gonski<sup>39</sup>, S. González de la Hoz<sup>170</sup>, S. Gonzalez Fernandez<sup>13</sup>, R. Gonzalez Lopez<sup>90</sup>, C. Gonzalez Renteria<sup>17</sup>, R. Gonzalez Suarez<sup>168</sup>, S. Gonzalez-Sevilla<sup>54</sup>, G.R. Gonzalvo Rodriguez<sup>170</sup>, R. Y. González Andana<sup>50</sup>, L. Goossens<sup>36</sup>, N.A. Gorasia<sup>20</sup>, P.A. Gorbounov<sup>121</sup>, H.A. Gordon<sup>29</sup>, B. Gorini<sup>36</sup>,