HUGO ALBERTO AYALA SOLARES

PHD PHYSICS

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WORK EXPERIENCE

PostDoctoral Researcher

Pennsylvania State University

May 2017 – Ongoing | State College, PA, United States

- Builiding and mantaining the Astrophyiscal Multimessenger Observatory Network (AMON)
- Member of the High Altitude Water Cherenkov (HAWC) Observatory
- Member of the IceCube Neutrino Observatory
- Develop coincidence analyses between different datasets to find interesting candidate multimessenger sources.
- Study gamma-ray emission from large-scale structures with HAWC data. Calculating credible intervals on the amount of emission of these sources.
- Search of sources of gamma-ray and neutrino emission by using likelihood ratios and bayesian statistics.

Ph.D. Researcher

Michigan Technological University

2011-2017 | Houghton,MI,United States

- Created and mantained laser calibration system of the HAWC detector.
- Developed algorithms to reconstruct astrophysical events.
- Developed an algorithm to search for weak signal in high-level background

Research Intern

Photonics and Mathematical-Optics Group, ITESM

Spring 2011 | Monterrey, N.L. Mexico

- Studied equations for spiral profiles of light after passing through birefrigent objects.

EDUCATION

Ph.D. in Physics focused on Astrophysics

Michigan Technological University

September 2011 – April 2017 | Houghton, MI, United States

Thesis title: Search for High-Energy Gamma Rays in the Northern Fermi Bubble Region with the HAWC Observatory

B.Sc. in Engineering Physics

Instituto Tecnológico y de Estudios Superiores de Monterrey

August 2006 – December 2010 | Monterrey, N.L., Mexico

LANGUAGES

Spanish (Native Language) | English (Fluent) | German (Intermediate)

TECHNICAL SKILLS

Python

NumPy, SciPy, matplotlib, pandas, scikit-learn, astropy, amonpy(developer), joblib, twisted, celery

C++

Bash

Git

MySQL

Statistical Analysis

Confidence intervals, Bayesian Statistics, Monte Carlo methods, Optimization

Machine Learning

Classification, Regression, Clustering, Feature engineering, Bayesian optimization

LATEST PUBLICATIONS

Journal Articles

- Solares, Hugo A. Ayala et al. (2020). "The Astrophysical Multimessenger Observatory Network (AMON): Performance and science program". In: *Astroparticle Physics* 114, pp. 68–76. ISSN: 0927-6505. DOI: https://doi.org/10.1016/j.astropartphys.2019.06.007. URL: http://www.sciencedirect.com/science/article/pii/S0927650519301227.
- Ayala Solares, Hugo Alberto (2019). "AMON Multimessenger Alerts: Past and Future". In: *Galaxies* 7.1. ISSN: 2075-4434. DOI: 10.3390/galaxies7010019. URL: https://www.mdpi.com/2075-4434/7/1/19.
- Solares, H. A. Ayala et al. (2019). "A Search for Cosmic Neutrino and Gamma-Ray Emitting Transients in 7.3 yr of ANTARES and Fermi LAT Data". In: *The Astrophysical Journal* 886.2, p. 98. DOI: 10.3847/1538-4357/ab4a74. URL: https://doi.org/10.3847%2F1538-4357%2Fab4a74.