

Searching for RF-Only Triggered Cosmic Ray Events with the High-Elevation BEACON Prototype

Daniel Southall^{1,*} on behalf of the BEACON Collaboration
(a complete list of authors can be found at the end of the proceedings)

¹*Department of Physics, Enrico Fermi Institute, Kavli Institute for Cosmological Physics, University of Chicago, 5720 S Ellis Ave #201, Chicago, IL 60637, USA*
E-mail: dsouthall@uchicago.edu

The Beamforming Elevated Array for COsmic Neutrinos (BEACON) is a concept for a neutrino telescope designed to measure tau lepton air showers generated from tau neutrino interactions near the horizon, a detection mechanism which provides a pure measurement of the tau flavor of cosmogenic neutrinos. This contribution describes the hardware and calibration progress seen by the BEACON prototype, as well as the ongoing analysis which aims to demonstrate RF-only triggering on cosmic rays with the BEACON prototype. Early event characterizations, parameter clustering, and cuts are presented using position calibrations obtained through a combination of analyzing signals from RFI events as well as precision RTK-GPS measurements taken during the June 2021 deployment.

Full Authors List: BEACON

D. Southall^{1,*}, S. A. Wissel^{2,3}, J. Alvarez-Muñiz⁴, W. Carvalho Jr.⁵, A. Cummings⁶, Z. Curtis-Ginsberg¹, C. Deaconu¹, K. Hughes¹, A. Ludwig^{1,7}, K. Mulrey⁸, E. Oberla¹, S. Prohira⁹, A. Romero-Wolf¹⁰, H. Schoorlemmer¹¹, A. G. Viereg¹, E. Zas⁴, A. Zeolla²

¹University of Chicago, ²Penn State University, ³California Polytechnic State University, ⁴Instituto Galego de Física de Altas Enerxías IGFAE, Universidade de Santiago de Compostela, 15782 Santiago de Compostela, Spain, ⁵Univerisade de São Paulo, Brazil, ⁶Gran Sasso Science Institute, ⁷University of California, Los Angeles, ⁸Physics Dept., Vrije Universiteit Brussel, ⁹The Ohio State University, ¹⁰Jet Propulsion Laboratory, California Institute of Technology, ¹¹Max-Planck-Institut für Kernphysik

This work is supported by NSF Awards # 2033500, 1752922, 1607555, & DGE-1746045 as well as the Sloan Foundation, the RSCA, and NASA (support through JPL and Caltech as well as Award # 80NSSC18K0231). This work has received financial support from Xunta de Galicia (Centro singular de investigación de Galicia accreditation 2019-2022), by European Union ERDF, by the “María de Maeztu” Units of Excellence program MDM-2016-0692, the Spanish Research State Agency and from Ministerio de Ciencia e Innovación PID2019-105544GB-I00 and RED2018-102661-T (RENATA).

We thank the NSF-funded White Mountain Research Station for their support.

37th International Cosmic Ray Conference (ICRC 2021)
July 12th – 23rd, 2021
Online – Berlin, Germany

*Presenter