Abstract Submitted
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Evolving Antennas for Radio Detection of Ultra-High Energy Neutrinos[1] JULIE ROLLA, The Ohio State University, PROF. AMY CONNOLLY, Ohio State University, KAI STAATS, Embry-Riddle (Prescott), PROF. STEPHANIE WISSEL, PROF. DEAN ARAKAKI, Cal Poly, IAN BEST, SUREN GOURAPURA, Ohio State University, COREY HARRIS, Cal Poly, HANNAH HASAN, Ohio State University, LUKE LETWIN, Cal Poly, DR. CARL PFENDNER, Ohio State University, JORDAN POTTER, Kenyon College, SAM ROMANO, Cal Poly, LUCAS SMITH, Ohio State University, JACOB TREVITHICK, MAX WALKER, JOHN WOOKEY, Cal Poly, ANTENNA EVOLUTION PROJECT FOR NEUTRINO DETECTION TEAM — Evolutionary algorithms borrow from biology the concepts of mutation and selection in order to evolve optimized solutions to known problems. These algorithms can be used in a multitude of applications, such as data classification, multivariate regression, and parameter optimization. We are investigating the use of these methods for designing antennas adapted for detection of neutrinos in experiments that utilize the Askaryan radio Cerenkov technique. We are developing genetic algorithms to design antennas that are more optimally sensitive to UHE neutrino-induced radio pulses than current designs. The projects integrate the XFdtd finite-difference time domain modeling program as a test environment against an assigned fitness score for each evolved solution, based on its sensitivity to neutrino detection. We will summarize initial results of these approaches establishing the feasibility of this approach.

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Amy Connolly
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