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Analyzing the Correlation between High Energy Neutrinos and Cosmic Rays MICHAEL KOVACEVICH, MICHAEL SUTHERLAND, JAMES BEATTY, Ohio State Univ - Columbus, ICECUBE COLLABORATION — Neutrinos are nearly massless particles that pervade the universe while cosmic rays are highly energetic charged particles. Since neutrinos are electrically neutral, they can travel straight from their source without deflection; cosmic rays are affected by magnetic fields and this results in their paths being bent. It remains to be answered how high-energy neutrinos (HEν) and high-energy cosmic rays (HECR) are produced and what sources can accelerate these particles to such high energies. The purpose of this correlation study comes from the idea that some observed HEν and HECR may be produced by the same astrophysical sources. Using data from the IceCube experiment, it is possible to create a window around each detected HEν and measure how many HECR pass through this window. To calculate the expected number of HECR per window, a model was created that uses Monte Carlo methods to randomize the HECR events. Comparing the number of observed HECR per window to the expected number of HECR per window allows for a correlation value to be calculated. It can then be calculated if this value is statistically significant. Statistically significant correlation values could help to either confirm or deny that HEν and HECR tend to originate from nearby astrophysical sources.

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