Abstract Submitted
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NuLat: A Novel Design for a Reactor Anti-Neutrino Detector[1] S. DEREK ROUNTREE, Virginia Tech, NULAT COLLABORATION — NuLat is a proposed very-short baseline (3-10m) reactor electron antineutrino (anti-ν_e) experiment that will probe the current best fit for light sterile neutrino mixing, the 5 MeV excess seen in current short baseline reactor experiments, and serve as a portable surface detector for cooperative ($\sim$ 30m baseline) surface monitoring of reactors. The NuLat detector will use an optically segmented 3D Raghavan optical lattice (ROL) detector that channels light via total internal reflection from a scintillation event down the 3 primary axes to the detector faces. The high degree of segmentation allows for each voxel's energy to be determined independently of other voxels, thus providing high temporal and spatial resolution and energy reconstruction independent of position. NuLat detects anti-ν_e via inverse beta decay (IBD), which produces a positron and a neutron. Most of the time, the positron deposits its kinetic energy into a single voxel allowing superior derivation of the incident anti-ν_e's energy. The final state neutron is captured via (n,α) on ^{6}Li or ^{10}B after a characteristic delay time giving a coincidence tag. This talk will discuss the physics reach of NuLat using a solid loaded scintillator, and the timeline of the NuLat reactor anti-ν_e program.

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