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Experimental Anomalies in Neutrino Physics

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In recent years, experimental anomalies ranging in significance (2.8-3.8σ) have been reported from a variety of experiments studying neutrinos over baselines less than 1 km. Results from the LSND and MiniBooNE short-baseline $\nu_e/\bar{\nu}_e$ appearance experiments show anomalies which cannot be described by oscillations between the three standard model neutrinos (the "LSND anomaly"). In addition, a re-analysis of the anti-neutrino flux produced by nuclear power reactors has led to an apparent deficit in $\bar{\nu}_e$ event rates in a number of reactor experiments (the "reactor anomaly"). Similarly, calibration runs using ^{51}Cr and ^{37}Ar radioactive sources in the Gallium solar neutrino experiments GALLEX and SAGE have shown an unexplained deficit in the electron neutrino event rate over very short distances (the "Gallium anomaly"). The puzzling results from these experiments, which together may suggest the existence of physics beyond the Standard Model and hint at exciting new physics, including the possibility of additional low-mass sterile neutrino states, have raised the interest in the community for new experimental efforts that could eventually solve this puzzle. Definitive evidence for sterile neutrinos would be a revolutionary discovery, with implications for particle physics as well as cosmology. Proposals to address these signals by employing accelerator, reactor and radioactive source experiments are in the planning stages or underway worldwide. In this talk some of these will be reviewed, with emphasis on the accelerator programs.