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Recent results from the ICARUS experiment

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ICARUS is the largest liquid Argon TPC detector ever built (~600 ton LAr mass). It was smoothly operated underground at the LNGS laboratory in Gran Sasso since summer 2010, up to june 2013,
collecting data with the CNGS beam and with cosmics. Liquid argon TPCs are really “electronic bubble chambers” providing a completely uniform imaging and calorimetry with unprecedented accuracy on massive volumes.
Icarus is internationally considered as a milestone towards the realization of next generation of massive detectors (~tens of ktons) for neutrino and rare event physics. It permits as a unique feature the unambiguous identification of nu_e events. In particular the experimental search for a nu_e signal in the LSND anomaly region in the CNGS beam will be here presented with an updated statistics with respect to the published one. The published result strongly limits the window of opened options for the LSND anomaly, reducing the remaining effect to a narrow region centred around (Dm2 , sin2 (2theta)) = (0.5eV2 , 0.05) where there is an over-all agreement (90% CL) between the present ICARUS limit, the published limits of KARMEN and the published positive signals of LSND and MiniBooNE collaborations. There is tension between our limit and the neutrino lowest energy points of MiniBooNE with 200 < EÎ½ < 475 MeV, suggesting an instrumental or otherwise unexplained nature of the low energy signal reported by MiniBooNE. This relevant parameter region will be fully explored by a proposed dual detector experiment to be performed at a short baseline and low neutrino energies which increase the event rate, reduce the overall multiplicity of the events, enlarge the angular range and therefore substantially improve the nue selection efficiency.

Summary

Primary author(s) : Prof. GIBIN, Daniele (Dipartimento di Fisica ed Astronomia ”G. Galilei” e INFN sezione di Padova)

Presenter(s) : MENEGOLLI, Alessandro (Universita di Pavia)

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