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Neutrino Physics at ADS Facilities

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Accelerator Driven System (ADS) subcritical reactors are being developed around the world. The main goals of this kind of facility are to produce energy and, at the same time, to dispose of nuclear waste, which will be used to power nuclear reactors. Since, by itself, used nuclear fuel is not able to sustain a chain reaction, the additional neutrons needed will be supplied by a high-intensity accelerator, where a proton beam will be hitting a spallation target. This accelerator will produce, as a by-product, a large quantity of neutrinos: I will discuss the opportunities offered by this kind of facilities to the study of neutrino physics. I will focus in particular on the accelerators that will be constructed as part of the China-ADS program: here in the first phases of the project $\bar{\nu}_e$ can be produced via Isotope Decay At Rest (IsoDAR): they can be detected with liquid scintillators and used to provide competitive bounds on sterile neutrinos in the disappearance channel. In the next phases, when the beam energy is higher, $\bar{\nu}_\mu$ will be produced via muon Decay At Rest (μ DAR): in this phase it will be possible to measure the CP-violating phase δ_{CP} and to look for experimental signs of the presence of sterile neutrinos in the appearance channel, testing the LSND and MiniBooNE anomalies.

Experimental Collaboration

Author: Prof. CIUFFOLI, Emilio (IMP, CAS)

Presenter: Prof. CIUFFOLI, Emilio (IMP, CAS)

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