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Double Chooz Experimental Plan and Detector Design BRANDON WHITE, University of Tennessee, DOUBLE CHOOZ COLLABORATION — The goal for the Double Chooz experiment is to determine the value of $\sin^2(2\theta_{13})$, the remaining unmeasured neutrino mixing angle of the PMNS matrix. The Double Chooz experiment will perform new highly sensitive measurements for the oscillations of electron anti-neutrinos from nuclear reactors to probe small values of $\sin^2(2\theta_{13})$. To achieve the necessary sensitivity two identical detectors will be constructed. The near detector will be 400m from the reactor cores to measure the flux of electron anti-neutrinos. The far detector at 1.05km from the reactors will measure the electron anti-neutrinos after oscillations have occurred. The comparison of the anti-neutrino rates at both detectors will eliminate the uncertainty from the nuclear reactor anti-neutrino flux calculations and detector efficiencies. Improvements in systematic errors will be achieved also by advanced detector design. Each Double Chooz detector will have three inner regions; a target area, gamma catcher, and a buffer area. After three years of running with both detectors, the experiment will be sensitive to value of 0.03 for $\sin^2(2\theta_{13})$. The present limit from the first Chooz experiment is $\sin^2(2\theta_{13}) \quad < 0.15$ for $\Delta m^2_{31} = 2.5\text{x}10^{-3}$ eV^2.

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