

LEPP JOURNAL CLUB

SeungCheon Kim
Seoul National University



A Search for WIMP Dark Matter with CsI (TI) Crystal

Despite the convincing evidences for the existence of the dark matter in our universe, its identity is not figured out yet. Along with many other experiments to directly detect the dark matter, KIMS (Korea Invisible Mass Search) experiment has carried out WIMP (Weakly Interacting Massive Particle), one of the most popular dark matter candidates, search with an array of CsI (TI) crystal scintillators at Yangyang underground laboratory in Korea. The CsI (TI) scintillator is the widely used detector, which has some good features for the dark matter detection. Firstly, the nuclear recoil events--the candidate events for WIMPs--can be distinguished statistically by pulse shape discrimination. Secondly, since both target elements, Cs and I, have high spin expectation values for proton, the case of the WIMP-proton spin-dependent interaction can be tested with the good sensitivity. And, the very important feature of CsI (TI) is that it can cross-check the WIMP-iodine interaction interpretation for the results of DAMA/LIBRA experiment which has claimed the observation of the annual modulation signal from WIMP. However, unfortunately it has several inherent background such as Cs-134, Cs-137 which makes its application for the rare phenomena search very tough. KIMS has reduced the background level of the crystal to 2 - 3 counts/day/kg/keV below 10 keV electron recoil equivalent energy -- the energy region for WIMP search -- and has collected the data based on 103.4 kg of the low background crystals for several years at Yangyang underground laboratory. The recent analysis results from KIMS experiment will be presented in the seminar.

Thursday
October 4, 4:00 pm
301 Physical Sciences Building
(Refreshments, 3:45pm)

