Abstract Submitted for the HAW05 Meeting of The American Physical Society

Performance test of the prototype detector for Dark Matter Search AKIKO YANAGISAWA, Department of Physics, Graduate School of Science, Osaka University, TADAFUMI KISHIMOTO, IZUMI OGAWA, RYUTA HAZAMA, SEI YOSHIDA, SAORI UMEHARA — Extensive observational evidence indicates that non-luminous, dark matter comprises a large fraction of the matter in the universe. Recent observation of cosmic microwave background suggests that dark matter consists predominantly of non-baryonic particles, and Weakly Interacting Massive Particles (WIMPs), neutralino dark matter are presently most favored. These WIMPs would interact elastically with nuclei, generating recoil energy of a few tens of keV, at a rate smaller than $\sim 1 \text{event/kg/day}$. We have developed a CaF₂ scintillation detector system (ELEGANT VI) to search for spin coupled dark matter by elastic scattering of ¹⁹F. Because of the low-energy and low-event-rate, to improve the sensitivity of the detector system, we must achieve more light collection and background reduction. So we have started the study of the new design of the detector system which consists of cubic CaF_2 (pure) crystal all sides covered by light guides. In this system, more light collection and less background level are expected for much larger photo-coverage and CaF_2 (pure) low radioactivity, respectively. As a first stage, we are developing the prototype detector and testing the photon collection efficiency of the light guide system for the optimization. The performance of the prototype detector will be reported.

> Akiko Yanagisawa Department of Physics, Graduate School of Science, Osaka University

Date submitted: 25 May 2005

Electronic form version 1.4