

Abstract Submitted  
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**Search for the single- $\beta$  decay of  $^{48}\text{Ca}$**  HIROKI ANDO, KAZUYA TAKUBO, Department of Physics, Osaka University — Large efforts have been made to search for the single- $\beta$  decay of  $^{48}\text{Ca}$ , for the purpose of determining its lifetime. At present we have the experimental lower limit of the lifetime; it is  $T_{1/2} > 6.0 \times 10^{18} \text{yr}$  as the most stringent value, but is still much shorter than the theoretical estimate of  $T_{1/2} = 7.6 \times 10^{20} \text{yr}$ . We aim to satisfy the followings (1)~(3) in final phase of our experiment. (1) Enrichment of  $^{48}\text{Sc}$  which is a daughter nucleus of  $^{48}\text{Ca}$ . (2) To achieve the highest coincidence efficiency, we will use large detectors with optimum layout. (3) Background reduction by using appropriate shields and underground laboratory. We are preparing the first phase of our experiment where we will find the optimal layout of detectors and shields. We will then go to the enrichment. Presently we are searching for the optimum layout with GEANT4 simulation, considering rough experimental setup. We will use 6 NaI(Tl) detectors which is size of  $5 \times 5 \times 21 \text{cm}^3$ . We put these detectors close to each other to achieve  $4\pi$ -detector by which  $1160 \text{cm}^3$  of Ca sample can be fully covered. Then about 1000g  $\text{CaCO}_3$  powder (density is roughly  $1 \text{g/cm}^3$ ) can be put in this space. We will report the preliminary result of the first phase of our experiment and future plan.

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