Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Total cross section of Single-Quantum Annihilation YUSHI TSUBOTA, SYOGO IDA, SACHIO D. IMABEPPU — Positron annihilation with electron usually produces two 511 keV photons in a final state. There were intense experimental studies on the two and more photons in the final states although little studies have been carried out on a single-quantum annihilation (SQA). Here we report an experimental study of SQA. When an electron is bound in a nucleus, momentum can be carried away by the nucleus and SQA is allowed. There are theoretical and experimental studies on the dependence of positron kinetic energy and target atomic numbers (Z) where energetic positrons were used for the study. We carried out an experiment to search for SQA by a positron provided by a radioactive positron source of 22Na. We have low energy ($\sim$ 100 keV) positron and SQA spectrum represents and initial positron energy and binding energy of atomic electron with which the annihilation takes place. We discuss mechanism of SQA based on observed event rate and SQA energy spectrum.

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Date submitted: 05 Jul 2005 Electronic form version 1.4