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New limit on the T-violating transverse muon polarization in $\mathbf{K}^+ \rightarrow \pi^0 \mu^+ \nu$ (**K** μ **3**) decays SUGURU SHIMIZU, KEK-E246 COLLABORATION — A search for T-violating transverse polarization (Pt) in the $K\mu 3$ decay was performed using kaon decays at rest. Pt is the polarization component normal to the decay plane, and a T-odd observable. A nonzero value would be evidence for violation of time reversal invariance, because spurious effects from final state interaction are known to be small. Moreover, due to negligible contribution from the standard model, Pt would provide important clue to new physics beyond the standard model. The experiment was performed at the KEK 12 GeV proton synchrotron. The decay products were emitted in all directions and detected by a 12-sector ion-core superconducting toroidal spectrometer and a π^0 calorimeter with large directional acceptance. Pt was measured as the azimuthal muon polarization when π^0 is tagged in the forward or the backward direction relative to the beam direction. The signature of nonzero Pt is an asymmetry between clockwise and counterclockwise Michel positrons. The final result using all data taken in 1996-2000 was obtained to be $Pt=-0.0017\pm0.0023$ (stat) ±0.0011 (syst). The T-violation parameter was determined to be $\text{Im}\xi=-0.053\pm0.0071$ (stat) ±0.0036 (syst) giving an upper bound $|\text{Im}\xi| < 0.016$.

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