

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Superconducting qubits consisting of epitaxially-grown NbN/AlN/NbN Josephson junctions¹ YASUNOBU NAKAMURA, RIKEN/NEC, HIROTAKA TERAJ, NICT, KUNIHIRO INOMATA, RIKEN, TSUYOSHI YAMAMOTO, RIKEN/NEC, WEI QIU, ZHEN WANG, NICT — We demonstrate superconducting qubits using epitaxially-grown Josephson junctions. A fully epitaxial NbN/AlN/NbN trilayer on MgO (100) substrate is processed by photolithography and dry-etching into transmon qubits with a large Josephson energy. The tunnel barrier made of cubic-phase AlN, rather than the ordinary hexagonal phase, is the key to avoid piezoelectric coupling to the phonon bath. The energy-relaxation time and the spin-echo decay time of ~ 500 ns are observed in the qubits that are coupled to a monolithically-made coplanar waveguide resonator.

¹This work is partly supported by FIRST, MEXT-KAKENHI, and NICT.

Yasunobu Nakamura
RIKEN/NEC

Date submitted: 11 Nov 2011

Electronic form version 1.4