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ARPES studies of Na0.7CoO2 system D. QIAN, M.Z. HASAN, Joseph Henry Laboratories, Department of Physics, Princeton University, Y.-D. CHUANG, A. KUPRIN, A.V. FEDOROV, R. KIMMERLING, E. ROTENBERG, Z. HUSSAIN, H. KOH, Advanced Light Source, Lawrence Berkeley National Laboratory, N.S. ROGADO, M.L. FOO, R.J. CAVA, Department of Chemistry, Princeton University, Princeton — We have carried out a detailed (and first) angle-resolved photoemission study of Na0.7CoO2, the host material of the superconducting cobaltate series. Our results show a hole-type Fermi surface, a strongly renormalized quasiparticle band, a small Fermi velocity, and a large Hubbard U. The quasiparticle band crosses the Fermi level from M toward suggesting a negative sign of effective single-particle hopping teff (about 10 meV) which is on the order of magnetic exchange coupling J in this system. Temperature dependence of quasiparticles shows that spectral weight is well defined in the T-linear resistivity (non-Fermi-liquid) regime. Unusually small single-particle hopping and unconventional quasiparticle dynamics may have implications for understanding the phase of matter realized in this new class of strongly interacting quantum system.

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