Identification of possible proton two-quasiparticle band in $^{158}$Sm

J.H. HAMILTON, E.H. WANG, A.V. RAMAYYA, J.K. HWANG, Vanderbilt University, S.H. LIU, Vanderbilt University/Univ. of Kentucky, N.T. BREWER, Vanderbilt University/ORNL, Y.X. LUO, Vanderbilt University, J.O. RASMUSSEN, LBNL, S.J. ZHU, Tsinghua University, G.M. TER-AKOPIAN, YU. TS. OGANESSIAN, JINR — High-spin states in neutron-rich $^{158}$Sm have been re-investigated by measuring the prompt $\gamma$-rays emitted in the spontaneous fission of $^{252}$Cf. A new negative-parity band has been established up to spin 12. By comparing with the theoretical calculations [1], a two-quasiparticle proton state with $\pi \frac{5}{2}[532] \otimes \pi \frac{5}{2}[413]$ configuration has been proposed for the band head. The level energies are similar to those of the known levels in the negative two-quasiparticle neutron band [2,3] as predicted by theoretical calculations [1]. The systematics of the two-quasiparticle states and bands in this region are discussed.