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**Two-quasiparticle states in  $^{252,254}\text{No}$  and the stability of superheavy nuclei**<sup>1</sup> T.L. KHOO, Argonne National Laboratory, S.K. TANDEL, Univ. Massachusetts Lowell, A. ROBINSON, D. SEWERYNIAK, F.G. KONDEV, Argonne National Laboratory — Two-quasiparticle (qp) states in shell-stabilized nuclei probe the levels that govern the stability of superheavy nuclei, test 2-qp energies from theory and, thereby, check their predictions of magic gaps. We have identified in  $^{254}\text{No}$  2- and 4-qp isomers, with quantum numbers  $K^\pi = 8^-$  and  $(14^+)$ , and a low-energy 2-qp  $K^\pi = 3^+$  state, as well as a  $K^\pi = 8^-$  isomer in  $^{252}\text{No}$ . The use of Woods-Saxon single-particle energies reproduces the experimental proton 2-qp energies in  $^{254}\text{No}$ . Some shortcomings in the 2-qp energies from self-consistent mean-field theories suggest that their predictions of magic gaps at  $Z=120$  and  $126$  should be viewed with reservations. The resilient survival of superheavy nuclei with high  $Z$ , up to  $118$ , well past the onset of spontaneous fission at  $Z=92$ , is an interesting phenomenon in nuclear and mesoscopic physics. This research was conducted by a collaboration from Argonne National Laboratory and the Universities of Massachusetts Lowell, Jyväskylä, Köln, Liverpool, Maryland, Notre Dame and Yale.

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