Predominance of Prolate Nuclear Deformations Emerging from Many-Body Interactions[1] MIHAI HOROI, Department of Physics, Central Michigan University, Mount Pleasant, MI 48859, USA, VLADIMIR ZELEVINSKY, National Superconducting Cyclotron Laboratory, and Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan 48824 — A new approach to the old problem of the predominance of prolate deformations among well deformed nuclei is proposed within the shell model framework. The parameter space is explored using the ensemble of random rotationally-invariant interactions. Subsets with rotational energy ratio $E(4^+)/E(2^+)$ and the rigid-rotor relation between the quadrupole moment $Q(2^+)$ and the transition probability $B(E2; 2^+ \to 0^+))$ are found exhibiting prolate predominance. We identify matrix elements of the effective forces responsible for the predominance of prolate deformation.

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