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Stability of metal nanowires with multipolar cross sections CHARLES STAFFORD, University of Arizona, HAKAN TÜRECI, Yale University, JÉRÔME BÜRKI, University of Arizona, DANIEL URBAN, Albert-Ludwigs University, Freiburg, Germany, HERMANN GRABERT, Albert-Ludwigs University, Freiburg, Germany, DOUGLAS STONE, Yale University — A linear stability analysis of metal nanowires with arbitrary cross sections is performed within the nanoscale free-electron model, focusing on quadrupolar, hexapolar, and octopolar deformations. Families of stable wires with similar cross sections and various dimensions are found, which are stabilized semiclassically in the vicinity of bifurcations of important classical periodic electron orbits. For large deformations, quadrupolar cross sections are found to be most favorable. The predicted highly-deformed stable structures are compared to experimental data for Aluminum nanowires.

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