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Tom W. Bonner Prize in Nuclear Physics Lecture: The limits of nuclear landscape

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Understanding nuclei is a quantum many-body problem of incredible richness and diversity and studies of nuclei address some of the great challenges that are common throughout modern science. Nuclear structure research strives to build a unified and comprehensive microscopic framework in which bulk nuclear properties, nuclear excitations, and nuclear reactions can all be described. A new and exciting focus in this endeavor lies in the description of exotic and short-lived nuclei at the limits of proton-to-neutron asymmetry, mass, and angular momentum. In this talk, advances in the nuclear density functional theory will be reviewed in the context of the main scientific questions, experimental developments, and the advent of extreme-scale computing platforms.