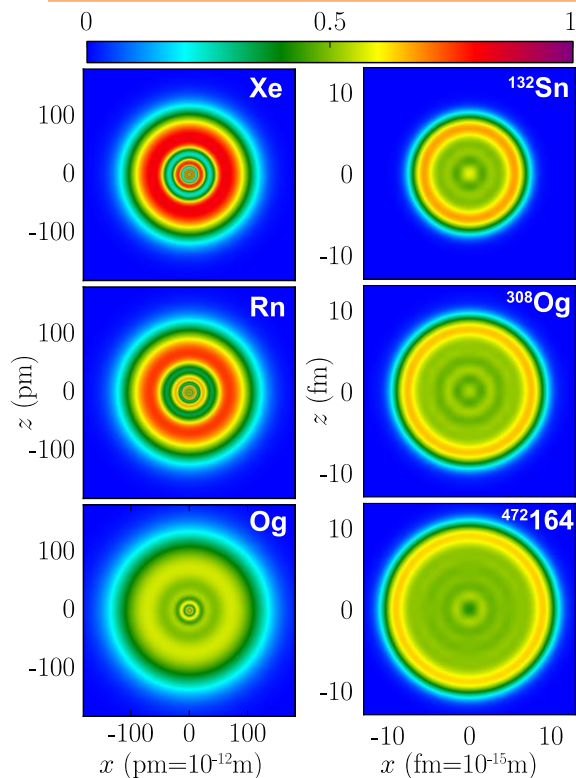


Oganesson is an oddball among atoms and nuclei

Objectives

- Oganesson (Og, Z118) is a recent addition to the periodic table of the elements and the chart of nuclides.
- Using state-of-the-art atomic and nuclear models, and advanced computational tools, we study the electronic and nucleonic shell structure of superheavy elements.



Left: Electron localization for noble-gas elements xenon, radon, and oganesson predicted in relativistic calculations. The outer electron shells of Og are expected to show weaker shell effects. Right: A similar transition to uniform-gas behavior in the valence region is also expected for the neutron localization of superheavy nuclei ^{308}Og and $^{472}164$ (right).

Impact

- Og is a rather unusual addition to the periodic table and to the chart of nuclides: it breaks our textbook picture of electronic and nucleonic shells.
- Og is expected to show uniform-gas-like behavior in the valence region both for electrons and neutrons. Consequently, Og is expected to be a metal at room temperature.

Accomplishments

- Publication: P. Jerabek, B. Schuetrumpf, P. Schwerdtfeger, and W. Nazarewicz, [Phys. Rev. Lett. 120, 053001 \(2018\)](#).
- Highlighted as Editors' suggestion.
- Featured in Physics (phys.aps.org) as Viewpoint: [Heaviest Element Has Unusual Shell Structure](#)
- Featured on the cover of Phys. Rev. Lett. 120(5) issue.
- Featured by [Physics Today](#), [Nature](#), [Physics World](#), [Science News](#), [Gizmodo](#), [Phys.org](#), [Chemistry World](#), and many international news outlets.