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D. Seweryniak,¹ T. Huang,^{1,2} K. Auranen,^{1,11} A.D. Ayangeakaa,^{1,12} B.B. Back,¹ P. Bender,³ M.P. Carpenter,¹ P. Chowdhury,³ R.M. Clark,⁴ P. Copp,¹ Z. Favier,¹⁰ K. Hauschild,⁸ X.-T. He,⁵ R.D. Herzberg,⁶ D. Ho,³ H. Jayatissa,¹ T.L. Khoo,¹ F.G. Kondev,¹ G. Morgan,⁷ C. Morse,⁴ A. Korichi,⁸ T. Lauritsen,¹ J. Li,¹ C. Mueller-Gatermann,¹ D. Potterveld,¹ W. Reviol,¹ A. Rogers,³ S. Saha,³ G. Savard,¹ K. Sharma,³ S. Stolze,¹ S. Waniganeththi,³ G. Wilson,¹ J. Wu,¹ Y.-F. Xu,⁵ S. Zhu⁹

¹Argonne National Laboratory, Argonne, IL 60439, USA

²Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou 730000, China

³University of Massachusetts, Lowell, MA 01854, USA

⁴Lawrence Berkeley National Laboratory, Berkeley, CA 94720, USA

⁵College of Materials Science and Technology, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China

⁶University of Liverpool, Liverpool, UK

⁷Louisiana State University, Baton Rouge, LA 70803, USA

⁸CSNSM, IN2P3-CNRS Orsay, France

⁹Brookhaven National Laboratory, Upton, NY 11973, USA

¹⁰CEA, Département de Physique Nucléaire, Université Paris-Saclay, 91191, Gif-sur-Yvette, France

¹¹Accelerator Laboratory, Department of Physics, University of Jyväskylä, FI-40014 Jyväskylä, Finland

¹²Triangle Universities Nuclear Laboratory, Duke University, Durham, North Carolina 27708, USA

Deformed nuclei near the $Z=100$, $N=152$ deformed shell gaps are a stringent testing ground for nuclear models which are used to describe the heaviest known nuclei. Nuclei in this region have been studied using in-beam, K -isomer, α -decay and spontaneous fission spectroscopic methods. To extend these studies to odd- A , odd-odd, and to heavier nuclei the Argonne Gas-Filled Analyzer (AGFA) was constructed. During the talk, recent decay and isomer spectroscopy experiments with AGFA in stand-alone mode and in-beam spectroscopy experiments with AGFA coupled to the Gammasphere γ -ray detector array will be reviewed. Among others, the observation of the ground-state rotational band in the fissile nucleus ^{254}Rf and the discovery of the new isotope ^{251}Lr will be discussed. The moment of inertia deduced for ^{254}Rf shades light on the shape evolution in this region while the observed α -decay fine structure in ^{251}Lr provides information on single-proton orbitals near the Fermi surface. Plans for experimental program with AGFA will be also presented.

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Primary author: SEWERYNIAK, D. (Physics Division, Argonne National Laboratory, Argonne, IL 60439)

Presenter: SEWERYNIAK, D. (Physics Division, Argonne National Laboratory, Argonne, IL 60439)

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