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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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