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Investigating the Structure of High-Spin Francium M. EVTIMOVA, C. BEAUSANG, B. DARAKCHIEVA, B. CRIDER, R.B. CAKIRLI, V. WERNER, D. MEYER, E. NOVITSKI, G. GURDAL, J. QIAN, L. AMON, R. CASPERSON, C. FITZPATRICK, Univ. of Richmond — The purpose of this research is to investigate the structure of high-spin nuclei with odd atomic number, in particular Francium 209 and Francium 210 nuclei. This experiment was done in the Wright Nuclear Structure Laboratory at Yale University in the summer of 2005. I have been involved in the analysis of these results since September 2005. In the experiment a gold target is bombarded by a beam of accelerated oxygen ions. The beam was supplied by the ESTU accelerator at WNSL. Au-197 and O-16 nuclei fuse to produce Fr-213, which then "evaporates" neutrons, resulting in Fr-209 (4n) and Fr-210 (3n). These Fr nuclei emit gamma rays in order to lower their energy and achieve their ground states. These gamma rays were detected using the gamma detector array YRAST Ball, and the spectra they produce reveal information about the energy difference between levels in the level scheme. However, the gamma ray spectra do not directly show the order in which the transitions occur. Therefore, I am using various spectral analysis techniques, including gamma-gamma coincidences and gamma correlations, in order to determine what energies and what transformations are allowed for these nuclei. I have already found new information about both nuclei. However, there are still some discrepancies in the data for Fr-210. I am going to continue working on them, and I hope to resolve the problems soon.

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