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Status of the search for the heaviest elements[1]

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The heavy element group at Lawrence Livermore National Laboratory (LLNL) has had a long tradition of nuclear and radiochemistry dating back to the 1950's. Some of the most exciting work has taken place in the last decade in collaboration with the Flerov Laboratory of Nuclear Reactions in Dubna, Russia, with the discovery of five new elements - 113, 114, 115, 116, and 118. By pushing the boundaries of the periodic table, we can start to answer some of the most fundamental questions of nuclear science, such as the locations of the next "magic numbers" of protons and neutrons, and the possibility of an "Island of Stability" where nuclides would have lifetimes much longer than those currently observed in the heaviest elements. We have already seen evidence of extra-stability in the heaviest nuclides, which leads to half-lives that are long enough for us to perform chemistry on these isotopes one atom at a time. In this presentation, recent results and future directions of heavy element science will be presented.

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