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FIONA: A new mass analyzer for superheavy elements NICHOLAS ESKER, University of California, Berkeley; Lawrence Berkeley National Laboratory, JACKLYN GATES, GREGORY PANG, KENNETH GREGORICH, Lawrence Berkeley National Laboratory — Six new superheavy elements ($Z = 113 - 118$) and over fifty new transactinide isotopes ($Z > 104$) have been synthesized in compound nuclear fusion reactions using ^{48}Ca beams on actinide targets in the last 15 years. These superheavy elements (SHE) are short-lived and their decay chains end before reaching nuclides with unambiguously determined Z or A. At the LBNL 88" Cyclotron, we use the Berkeley Gas-Filled Separator (BGS) to study the production and decay of SHE produced at rates of a few atoms per week. The BGS's high beam suppression comes with poor mass resolution and detection is hindered by the high background rates from the proximity to the target and beamstop. Ongoing upgrades to the BGS, including product thermalization and transport, will allow us to couple a mass analyzer to the BGS. Known as FIONA (Fast Identification Of Nuclide A), the analyzer is a mass separator designed for 100% transmission with an expected mass resolution of 2000A/Δ A. These upgrades will greatly increase sensitivity by delivering mass-separated superheavy element nuclei to a low-background detector system on a 10-ms timescale. The current progress in commissioning the FIONA mass analyzer and the future directions of the project will be presented.

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