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FIONA: A new mass analyzer for superheavy elements NICHOLAS ESKER, LBNL, UCB, JACKLYN GATES, KENNETH GREGORICH, GREGORY PANG, LBNL, HEINO NITSCHE, LBNL, UCB — Six new superheavy elements (SHE, $Z = 112 - 118$) and over fifty new transactinide isotopes ($Z > 104$) have been synthesized in compound nuclear reactions using ^{48}Ca on actinides. These SHE are short-lived; their decay chains end in spontaneous fission before reaching a known mass region. Direct mass determination was unavailable and their A assignments remain unconfirmed. At LBNL, we use the 88"-cyclotron to produce high intensity beams (10^{13} particles per second) and the Berkeley Gas-Filled Separator (BGS) to isolate and study such transactinides at a rate of atoms per week. Unfortunately, the BGS's high beam suppression comes at the cost of mass resolution. Ongoing upgrades to the BGS, including beam thermalization and fast ion transport, will allow us to couple a dedicated mass analyzer to the BGS. This Facility for Identification Of Nuclide A (FIONA) is a novel mass separator based on an unbalanced Wien velocity filter. It has been designed for 100% transmission with an expected mass resolution of ≈2000 A/ΔA. We present the current progress in commissioning the FIONA mass analyzer using a ^{nat}Xe ion source and the future directions of the project, including the first direct mass measurement of a superheavy element.

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