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Before New Big Science: Alfred O. C. Nier and the Resurrection of Mass Spectrometry

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The mass spectrometer found its first success as a means to determine the isotopic masses and constitutions of chemical elements. As the last known elements were analyzed, its future in physics and chemistry laboratories was in doubt. From the 1940s to the 1960s, however, the mass spectrometer transformed from an instrument built for a specific purpose into a flexible analytical tool that brought together researchers from disciplines across the natural sciences. This talk examines that transition through the career of Alfred Otto Carl Nier, the University of Minnesota mass spectroscopist who was instrumental in both finding new realms where his favored tool could be applied and in building an interdisciplinary community around it. It argues that the reinvention of the mass spectrometer that Nier helped effect prefigured a similar transition in accelerator laboratories, which Catherine Westfall and Robert P. Crease have called “New Big Science,” some decades later.