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The Charged Particle Spectroscopy Program at TUNL

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Nuclear processing of matter provides the energy that makes stars shine and was responsible for the creation of the elements. For most of a stars life, this processing occurs at low energies, where charged particle reaction cross sections are often too small to measure using conventional methods. Studying these cross sections directly in the laboratory therefore requires high beam flux and low-background detection systems. To circumvent these limitations, novel methods can be employed, such as particle transfer measurements. At the Triangle Universities Nuclear Laboratory, we recently began a new charged particle spectroscopy program using an upgraded Enge Split-pole Spectrograph. Using this powerful equipment, we can better understand the nuclear structure underlying astrophysical reactions and thus constrain their cross sections. I will describe the Enge Spectrograph research program, detailing recent upgrades and experimental progress, and will highlight our plans for further upgrades.