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Precision Mass Cartography near the Island of Inversion AARON GALLANT, University of British Columbia, THOMAS BRUNNER, TRIUMF, USMAN CHOWDHURY, University of Manitobia, STEPHAN ETTENAUER, TEGAN MACDONALD, University of British Columbia, VANESSA SIMON, ANKUR CHAUDHURI, ANIA KWIATKOWSKI, BRAD SCHULTZ, MATRIN SIMON, TRIUMF, DAVID LUNNEY, CSNSM-IN2P3-CNRS, JENS DILLING, TRIUMF — A cornerstone of modern nuclear theory is the existence of the so-called "magic" numbers. Nuclei with a magic number of protons or neutrons are marked by a significant increase in binding energy. Recently much experimental and theoretical effort has been expended trying to elucidate how the magic numbers evolve towards the particle drip-lines. For example, it was recently found that new magic numbers N = 14, 16 appear far from stability, while the magic number N=20 disappears in the nuclide 32Mg. A method to investigate the evolution of the N=20 magic number is through atomic mass measurements. One of the first indications that the known magic numbers may begin to disappear was in the Na isotopic chain. It was observed that the two neutron separation energy S2n turns up at the neutron magic number N=20. This is opposite to the trend one would expect at a magic number. To investigate the disappearance of the N=20 shell closure the TITAN Penning trap mass spectrometer was employed to perform precision mass measurements in the Na, Mg and Al isotopic chains. We will present new precision mass measurements of 29-31Na, 30-34Mg and 29-34Al and discuss their role in determining the behavior of the N=20 shell gap.

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