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Traveling-wave deceleration of ammonia YOMAY SHYUR, NOAH FITCH, HEATHER LEWANDOWSKI, JILA, University of Colorado Boulder — Stark deceleration is a molecular beam manipulation technique where electric field gradients are used to produce a sample of cold polar molecules. Traditional pulsed Stark decelerators use digitally switched voltages in order to produce a time-averaged moving potential well to decelerate the molecules. The introduction of traveling-wave Stark decelerators presents a more efficient beam deceleration and trap loading method. By utilizing genuine moving three-dimensional potential wells, the traveling-wave Stark decelerator leads to greater number and density of trapped molecules. The dominant technical challenge to building a traveling-wave Stark decelerator is producing the high-voltage analog waveforms necessary to decelerate a molecular beam from a velocity of hundreds of m/s to rest. Our particular experiment requires 30 kV amplifiers capable of peak currents of 1.5 amps operating over a frequency range of 0-30 kHz. We report on our approach to this challenge and progress towards decelerating and trapping deuterated ammonia (ND_3) from a supersonic beam using a traveling-wave Stark decelerator.

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