A REASSESSMENT OF THE ALUMINUM HYPERFINE STRUCTURE OF AlH AND AlD ($^1\Sigma^+$)

D. T. HALFEN and L. M. ZIURYS, *Department of Chemistry, Department of Astronomy, and Steward Observatory, University of Arizona, Tucson, AZ, 85721*.

The J = 0 $\rightarrow$ 1 transition of AlH at 377 GHz and the J = 1 $\rightarrow$ 2 line of AlD at 393 GHz in their $^1\Sigma^+$ ground states have been measured using sub-millimeter direct absorption methods. These species were created by the reaction of aluminum vapor and H_2 or D_2 gas in a DC discharge. The ^{27}Al quadrupole hyperfine splittings, which are critical for the astronomical identification of these molecules, were measured for both AlH and AlD. In the case of AlH, the observed hyperfine pattern was not consistent with previous measurements. The new experimental quadrupole constant, eQq = -48.59 MHz, is in good agreement with recent *ab initio* calculations which found a value of -49 MHz. This study should enable viable astronomical searches to be conducted for these molecules, presumably with space-borne platforms.