

Abstract Submitted
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Measured Atomic Ground State Polarizabilities of 35 Metallic Elements¹ JOHN INDERGAARD, LEI MA, BAIQIAN ZHANG, ILIA LARKIN², Georgia Inst of Tech, RAMIRO MORO, Cameron University, Oklahoma, WALTER DE HEER³, Georgia Inst of Tech — Advanced pulsed cryogenic molecular beam electric deflection methods utilizing a position-sensitive mass spectrometer and 7.87 eV ionizing radiation were used to measure the polarizabilities of more than half of the metallic elements in the periodic table for the first time. These measurements increase the total number of experimentally obtained atomic polarizabilities from 23 to 57. Concurrent Stern-Gerlach deflection measurements verified the ground state condition of the measured atoms. Generating higher temperature beams allowed for the comparison of relative populations of the ground and excited states in order to extract the true temperature of the atomic beam, which followed the nominal temperature closely over a wide temperature range. Comparison of newly measured polarizabilities with state-of-the-art calculations exposes significant systematic and isolated discrepancies throughout the periodic table.

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