ELECTRONIC AUTODETACHMENT SPECTROSCOPY AND IMAGING OF THE ALUMINUM MONOXIDE ANION, ALO-

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The $^1\Sigma^+ \leftarrow^1 \Sigma^+$ ground state to dipole bound state electronic transition of AlO^- has been studied with both rotationally resolved autodetachment spectroscopy and high resolution velocity map imaging photoelectron spectroscopy in a newly constructed apparatus. Vibrational and rotational molecular constants have been determined for both the ground state ($\nu^{''}$ = 0,1) and excited dipole bound state ($\nu^{'}$ = 0,1) of the aluminum monoxide anion. The spectra yield the electron binding energy of the dipole bound state, and a more accurate electron affinity for AlO. The photoelectron anisotropies of several transitions were measured. Experimental findings are compared to high level *ab initio* calculations. Additionally, high resolution photodetachment imaging of AlO^- $^1\Sigma^+$ within energy ranges well above the detachment threshold were measured and compared to previous, low resolution photodetachment results.