THE PERMANENT ELECTRIC DIPOLE MOMENT OF CaD [a].

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In 2004 we determined from the analysis of the Stark effect in the $A^2\Pi - X^2\Sigma^+$ (0,0) band of system the magnitude of the permanent electric dipole moment, $|\mu|$, of CaH to be 2.94(16) D and 2.372(12)D for the $X^2\Sigma^2$ (v=0) and $A^2\Pi$(v=0) states,respectively[b]. The numbers in parenthesis are 1σ error estimates. Recently, two groups have performed high-level, all-electron, *ab initio* calculation and predicted μ values of 2.623 D[c] and 2.617 D[d] for the $X^2\Sigma^+$(v=0) state. Although inside a 2σ error estimate, these values are somewhat smaller than the experimentally observed value. In an effort to improve the precision of $|\mu|$, the Stark effect in the $B^2\Sigma^+$ - $X^2\Sigma^+$ (0,0) band system of CaD has been recorded and analyzed. As expected, the Stark effect is about four times larger in CaD compared to CaH. The analysis gives $|\mu|$ of 2.633(27) D and 2.018(33) D for the $X^2\Sigma^+$(v=0) and $B^2\Sigma^+$(v=0) state, respectively. A discussion of the isotopic dependence of μ and experimental systematic errors will be given. The trend in μ for the $X^2\Sigma^+$, $A^2\Pi$ and $B^2\Sigma^+$ is modeled using a simple molecular orbital picture.

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