MEASURING THE NUCLEAR HYPERFINE POPULATIONS IN THE GROUND ELECTRONIC STATE OF ATOMIC HYDROGEN USING VELOCITY-ALIGNED DOPPLER SPECTROSCOPY

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A variation on the technique of velocity-aligned Doppler spectroscopy has been used to measure the relative populations in the F=0 and F=1 nuclear hyperfine levels in the ground electronic state of atomic hydrogen produced in the 193 nm photolysis of HBr. This technique provides an unambiguous correlation between the H atom state distributions and the spin-orbit states of the counter fragment, i.e. $Br(^2P_{3/2})$ and $Br(^2P_{1/2})$. H atom state distributions are monitored by observing the (1+1) two-color multiphoton ionization spectrum exciting through the Lyman-α transition. Effects of small Stark fields on the observed spectra will be discussed.