High-Resolution Saturation Spectroscopy of the Sodium D Lines with a Pulsed Tunable Dye Laser

Abstract:

The sodium D resonance lines have been studied in saturated absorption with a repetitively pulsed tunable dye laser. The hyperfine splitting of the $3^2S_{12}$ and $3^2P_{12}$ states of Na$^{23}$ is resolved. Measurements with a delayed probe reveal a remanent hole burning in the velocity distributions of the two ground-state levels, caused by a velocity-selective optical pumping cycle. A time-resolved observation of the collisional-velocity thermalization in the presence of Ar buffer gas is reported.