Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Diode Pumped Cesium Laser T. EHRENREICH, B. ZHDANOV, T. TAKEKOSHI, S. P. PHIOPPS, R. J. KNIZE, US Air Force Academy — We have demonstrated a Cs vapor laser with diode laser pumping and have achieved a slope efficiency of 41% and overall optical efficiency better than 32%. A narrowband diode laser operating at 852 nm pumps the $6P_{3/2}$ state (D_2 line) which is then rapidly quenched to the $6P_{1/2}$ state by an ethane buffer gas. This creates a population inversion between the $6P_{1/2}$ and $6S_{1/2}$ states and lasing at 894 nm. The experimental set-up consisted of an injection seeded SDL-8630 diode laser pump and a Cs vapor cell positioned inside a stable laser cavity. The laser cavity was longitudinally pumped through the input cavity mirror. This mirror had a concave radius of 20 cm with 90% transmission at 852 nm and about 99% reflectivity at 894 nm. A series of flat output mirrors were used with reflectivities for both 894 nm and 852 nm ranging from 20% to 90%. The optimal output coupler reflectivity was 30% at 894 nm. The length of the laser cavity was 16.5 cm. The pump laser had a maximum output power of 500 mW at 852 nm with FWHM of less than 1 MHz. The Cs vapor cell was 2.5 cm long with Brewster windows at both ends. It was filled with metallic cesium and 100 Torr of ethane at 20 ^{o}C and was placed inside an oven. We acknowledge support from the Air Force Office of Scientific Research and the National Science Foundation under Grant No. 0355202

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Date submitted: 28 Jan 2005 Electronic form version 1.4