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**Magneto-optic effect near the D1 resonance of spin-polarized cold atoms** DONGHYUN CHO, Department of Physics, Korea University, JAI MIN CHOI, JANG MYUN KIM, JE HYUN LEE, Q-HAN PARK, LASER SPECTROSCOPY LABORATORY TEAM — We report our study of the magneto-optic effect in a strictly linear regime on spin-polarized cold cesium atoms. Due to the low intensity and the short illumination period of the probe beam, less than 7.5% of the sample atoms change their states by absorbing probe photons. We produce a medium of atoms at rest in either the $6S_{1/2}, F = 3, m_F = 0$ or $6S_{1/2}, F = 3, m_F = 3$ state by optically pumping atoms trapped in a magneto-optical trap. We use the $D1$ resonance with large lower and upper state hyperfine splittings as a probe transition to avoid hyperfine mixing from the Zeeman interaction. Under this idealized situation we measure the Stokes parameters in order to find the polarization rotation and circular dichroism experienced by the probe light. We find that there are qualitative differences between the results for the $m_F = 0$ and $m_F = 3$ cases. While dispersion and consequent Faraday rotation plays a dominant role when the atoms are in the $m_F = 0$ state, it is dissipation and circular dichroism that is important when they are in the $m_F = 3$ state. Similarly, while the size of the Faraday rotation and the circular dichroism for the $m_F = 0$ case scales linearly with the applied magnetic field, for the $m_F = 3$ case it is the shift of the probe polarization change versus frequency that is linearly proportional to the magnetic field strength.

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