OPTICAL ZEEMAN SPECTROSCOPY OF IRON MONOHYDRIDE, FeH

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The polarization signals induced by the Zeeman effect in the $X^4\Delta \leftarrow F^4\Delta$ band of FeH have been proposed for use in the characterization of stellar magnetic fields.[c] While the magnetic tuning of the low-rotational levels of the $X^4\Delta_{7/2}$ state has been measured by pure-rotational laser magnet resonance spectroscopy,[d] the strength of the Zeeman effect in the upper state is unknown. Here we report on the magnetic tuning of levels in (v=1)$F^4\Delta_{7/2}$ state derived from the analysis of the optical Zeeman spectra of the $X^4\Delta_{7/2} \leftarrow F^4\Delta_{7/2}$ (1,0) band system. The Zeeman broadening and splitting of the Q(3.5)($\nu = 11356.72$ cm^{-1}) transition were successfully modeled using a traditional effective Hamiltonian. The determined magnetic g_L-factor is 1.079(8) when the g_S-factor is constrained to 2.002. Plausible explanations for deviation of g_L from the expected value of unity will be given. The determined parameters are used to predict the magnetic tuning of the $X^4\Delta_{7/2} \leftarrow F^4\Delta_{7/2}$ (1,0) features for fields comparable to those found in sunspots.

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[c]S.V.Berdyugina, and S.K.Solanki, *Astron. Astrophys.* **385**, 201(2002)

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