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MJ 11 Raman Scattering in the Non- and low- T_c Superconductors Cr_3Si and Nb_3Sb .*† S. B. DIERKER, M. V. KLEIN, U. of Illinois, J. JØRGENSEN, Aarhus U. and Z. FISK and G. WEBB, UCSD.--Raman data on V_3Si and Nb_3Sn have shown an anomalous increase in the linewidth of the E_g optical phonon upon cooling (reaching $\sim 100\text{ cm}^{-1}$ in V_3Si at 50K).^{1,2} A similar but weaker anomaly exists in V_3Ge .³ We report Raman results on Nb_3Sb ($T_c \sim .2K$) and the non-superconductor Cr_3Si . The T_{2g} optical phonon has been clearly observed for the first time. The T_{2g} mode in Nb_3Sb and Cr_3Si and the E_g mode in Nb_3Sb exhibit an energy and width characteristic of a 'normal' phonon, hardening and narrowing slightly upon cooling. The T_{2g} mode results are consistent with weak coupling to the electrons while the E_g mode behavior in Nb_3Sb is consistent with its low electronic DOS. However in Cr_3Si the E_g mode has an anomalous width (70 cm^{-1} at 50K), shape, and temperature dependence (similar to V_3Ge ³) in spite of its low electronic DOS and temperature independent magnetic susceptibility.

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¹H. Wipf, et. al., Phys. Rev. Lett., 41, 1752 (1978).

²S. Schick Tanz, et. al., Phys. Rev., B22, 2386 (1980).

³R. Merlin, et. al., preceding abstract.