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Maximization of a Superconductor's Transition Temperature in a Boson - Fermion Model by Variation of the Boson Density of States and the Boson - Fermion Coupling Constants or for Spin Vector or Scalar Couplings Respective ARNO KAMPF, Institut fur Physik, University of Augusburg, D-86135 Augsburg Germany, J.R. SCHRIEFFER, Department of Physics and National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL 32310 — We have solved the problem of maximizing a superconductors transition temperature T_c by varying the Boson (spin fluctuation or phonon) density of states $N_B(\omega)$ and coupling constants, J_q or$g_{kq\lambda}$. We find that $T_c \sim 10^9\ ^0K$ can be obtained, for example in Heusler alloys, such as$Au_2\,(Mn_{2-x}\ A\ell_x)$, with$x \sim 0.1-0.5$. Also values of $H_{c2} \sim 10^{13}T$ and$j_c \sim 10^{13}\,Amps/cm^2$are predicted. Additionally results for the tunneling density of states$N_T\,(eV)$, the arpes cross section,$d\Delta/d\Omega d\omega$, $e.m.$, $I.R.$ and transport coefficients arising from these models will be presented. Also we will present a discussion of the 36 Leggett modes which our theory predicts to exist, whose energies are in the optical frequency range$[\omega \sim 1-3eV]$, versus the microwave frequency range for superfluid ^{3}He-A phase.

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