Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Theory of High-T_C Superconductivity: Accurate Predictions of T_C DALE HARSHMAN, Physikon Research Corporation, Lynden, WA 98264 USA; U. Notre Dame, Notre Dame, IN 46556 USA, ANTHONY FIORY, New Jersey Institute of Technology, Newark, NJ 07102 USA — The superconducting transition temperatures of high-T_C compounds based on copper, iron, ruthenium and certain organic molecules is discovered to be dependent on bond lengths, ionic valences, and Coulomb coupling between electronic bands in adjacent, spatially separated layers [1]. Optimal transition temperature, denoted as T_{C0}, is given by the universal expression $k_B T_{C0} = e^2\Lambda/\ell\zeta$; ℓ is the spacing between interacting charges within the layers, ζ is the distance between interacting layers and Λ is a universal constant, equal to about twice the reduced electron Compton wavelength (suggesting that Compton scattering plays a role in pairing). Non-optimum compounds in which sample degradation is evident typically exhibit $T_C < T_{C0}$. For the 31+ optimum compounds tested, the theoretical and experimental T_{C0} agree statistically to within $\pm$ 1.4 K. The elemental high-T_C building block comprises two adjacent and spatially separated charge layers; the factor e^2/ζ arises from Coulomb forces between them. The theoretical charge structure representing a room-temperature superconductor is also presented.
1. doi:10.1088/0953-8984/23/29/295701

Dale Harshman
Physikon Research Corporation, Lynden, WA 98264 USA

Date submitted: 10 Nov 2011 Electronic form version 1.4