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On the Isotope Effect in Superconductivity J.D. FAN, Southern University and A&M College, Baton Rouge, Louisiana, USA, YURIY MALOZOVSKY, Southeastern Louisiana University, Hammond, Louisiana, USA — The cutoff frequency ω_D introduced in the BCS theory leads to the well-known 0.5 isotope effect exponent, but conflicts with the 0, non-one-half or even negative exponents observed in high-temperature superconductors. In the framework of the repulsive Coulomb interaction and collective excitations, no cutoff is needed and allowed. We show that the contributions from Coulomb interaction, collective excitations and the contribution from phonons co-exist and compete leading to compensation. Depending on the structure of a superconductor and elements made of, the net contribution to the component α can be positive, negative or zero. It seems that the term that is called “dangerous” and dropped off in Bogolyubov’s Hamiltonian corresponds to the collective excitations in the field theory and should make a negative contribution to the isotope effect exponent α .

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