Predicting Superconducting Temperature of Elements from their Neutron Mass

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Superconducting temperature of elements as a function of neutron mass in their nucleus is explored and modeled. Empirical observation shows that the more balanced the mass of neutrons is to that of the protons in the nucleus, the higher is the superconducting temperature. A mathematical model for predicting superconducting temperature of elements is proposed using Coulomb's Force between incremental charge in the nucleus and the outermost electron. The nuclear charge in the model is modulated for incremental neutron mass over protons' and the permittivity of neutron assumed to mask that of vacuum between the nucleus and the outermost electron. Coulomb force is shown to correlate linearly with superconducting temperature of elements for which temperature data was already available. A different linear equation explains the behavior when neutron mass is greater than protons' in the nucleus vs not. Model R^2 is 0.97 when the neutron mass is greater and 0.65 when it is less than protons'. Using known mass of protons and neutrons, and distance to the outermost electron, superconducting temperature is predicted for all elements in the periodic table using the model even though actual data for superconducting temperature for most elements is not yet experimentally known. Seeming anomalies are highlighted. Trends are explained. Key areas for further investigation are outlined.

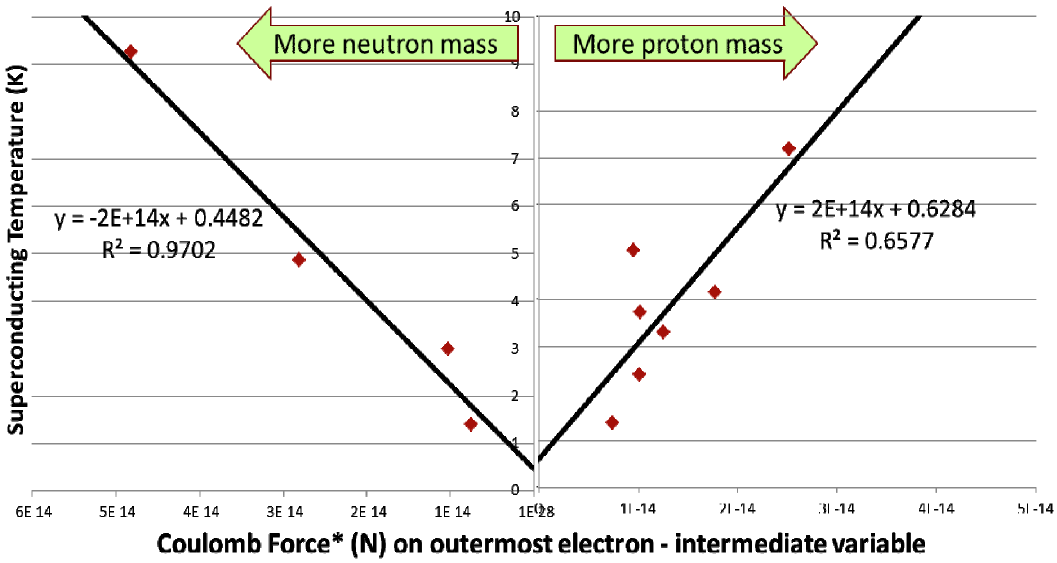

Fig. 1: Coulomb Force, scaled for relative neutron mass over protons', predicts superconducting temperature of elements.