Abstract for an Invited Paper
for the TSF06 Meeting of
The American Physical Society

Superconductivity: Developements And Prospects in Light Element Systems[1]

NEIL W. ASHCROFT, Cornell University

The concept of electron pairing, central to the phenomenon of superconductivity, owes its origin to the earliest claim of high temperature superconductivity in a very light element system (an alkali ammine). The presence of high dynamic energy scales makes light element systems attractive from the standpoint of the standard electron-phonon pairing mechanisms, but among the elements themselves, and under normal conditions it is well known that superconducting transition temperatures (Tc) are quite limited. From the latecomer superconductor MgB_2 ((Tc) $\sim$ 40K) it is now clear that for the light elements in combination the situation can change radically. Structures admitting large numbers of electrons per unit cell (and a corresponding proliferation of occupied bands) can be especially favorable for superconductivity. It was already recognized by Kamerlingh Onnes that this important phenomenon could eventually impact the energy sector. Accordingly it is of interest to examine both the pathway and the prospects for higher temperature superconductivity in systems of light elements (for example high hydrides) particularly with a view towards invoking a concept of chemical pre-compression.

[1]Work supported by the National Science Foundation.