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M1Po3A-04: Self-consistent solution of Eliashberg equations for metal hydride superconductors

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In the last years, the search for high critical-temperature superconductors has focused on metal and molecular hydrides, which may exhibit superconductivity at room temperature under very high pressures [1]. Actually, such behavior has been suggested by N. W. Ashcroft in 1968, since hydrogen-based materials possess elevated vibrational frequencies, as a consequence of the low atomic mass of hydrogen [2].

In this work, we present a self-consistent solution of the Eliashberg equations [3], in contrast to the widely used McMillan-Allen-Dynes parameterized one [4], where effects of the electron-phonon coupling, the density of states at the Fermi level and characteristic phonon frequencies are further analyzed. Finally, these two solutions are comparatively applied to several metal hydride superconductors, whose results are additionally contrasted with their measured critical temperatures.

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