

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 19 May 2016

17:00 -18:00

3rd Floor Seminar Room

"Lattice effects in high T_c superconductors"

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Abstract

Since the discovery of high temperature superconductors (HTS) the role of lattice to the pairing mechanism was questioned due to the small isotope effect on the transition temperature (T_c). Subsequent measurements have found that isotope effect of T_c is large in underdoped cuprates and it exists in the magnetic penetration depth, the pseudogap temperature, and some other characteristic quantities. But many researchers believe in a purely electronic origin of the pair coupling and ignore any contribution of the lattice in the high T_c superconductivity. Therefore, even now the effect of lattice in the HTS coupling is unclear. Following the discovery of cuprates with the highest up to now T_c at ambient pressures (133K and 164K at high pressures), other compounds have been discovered with most recent the sulphur hydride with even higher T_c (203K) at ~ 90 GPa. The pronounced isotope shift of this compound, consistent with BCS theory, points to an electron-phonon mechanism and shows that conventional coupling can induce very high T_c . In this presentation some experimental results will be presented that indicate the role of lattice in the HTS.