XXI Meeting of Physics 2021



Contribution ID : 71

Type : key notes

A possible path to design higher temperature superconductors

Saturday, 18 December 2021 15:15 (60)

Design of new materials with tailored properties requires detailed structural information in real and reciprocal spaces. Our recently published THz synchrotron experiments have provided evidence for the key role of bonding symmetry on superconductivity of MgB2 compounds. Another group of recent experiments has shown that external electric fields can control the superconducting transition temperature, via piezoelectric related phenomena according to DFT predictions. Further analyses of these results indicate that electric fields generated with small voltages induce structural and electron population effects, which resemble and are equivalent to those of very high pressures (in the tens of GPa's). Given that the recently discovered families of room temperature superconductors require very high pressure (in the hundreds of GPa's), our results suggest that electric fields of appropriate magnitude and symmetry may induce the correct conditions for higher temperature superconductivity, with more easily achievable means. The experimental evidence, calculation results and evolution of ideas will be discussed.

Primary author(s): ALARCO, Jose (Queensland University of Technology); Dr SHAHBAZI, Mahboobeh; Prof. MACKINNON, Ian

Presenter(s): ALARCO, Jose (Queensland University of Technology)

Session Classification : keynotes

Track Classification : Materials Science and Nanotechnology