

## Special Issue on Phonons and Electron Correlations in High-Temperature and Other Novel Superconductors

### Call for Papers

It has been now over 20 years since the discovery of the first high-temperature superconductor by Georg Bednorz and Alex Müller and yet, despite intensive effort, no universally accepted theory exists about the origin of superconductivity in cuprates. The absence of consensus on the physics of cuprate superconductors and the recent discovery of iron-based compounds with high transition temperatures have re-emphasized the fundamental importance of understanding the origin of high-temperature superconductivity. First-principles calculations based on density functional theory (DFT) often predict a rather weak electron-phonon interaction (EPI) insufficient to explain high transition temperatures. A number of researchers are of the opinion that the EPI may be considerably enhanced by correlation effects beyond DFT. Others maintain that the repulsive electron-electron interaction in novel superconductors is pairing and provides high transition temperatures without phonons. On the other hand, some recent studies using numerical techniques cast doubt that simple repulsive models can account for high-temperature superconductivity. Therefore, it seems plausible that the true origin of high-temperature superconductivity could be found in a proper combination of strong electron-electron correlations with a significant EPI.

This Special Issue will become an international forum for researchers to summarize recent developments in the field, with a special emphasis on the results in high-temperature superconductors and some other related materials that combine sizeable electron-phonon coupling with strong correlations. We invite authors to present original research papers as well as summarizing overviews stimulating the continuing efforts to understand high-temperature and other unconventional superconductors. Potential topics include, but are not limited to:

- Phonon spectroscopies of cuprates and related compounds
- Experimental evidence for electron-phonon interactions
- First-principles calculations of EPIs
- Strong-coupling extensions of the BCS-Eliashberg theory including polarons and bipolarons

- Interplay of electron-electron and electron-phonon interactions (Holstein-Hubbard, Fröhlich-Hubbard, tJ-Holstein, and similar models)
- Phase separation of correlated electrons
- EPI effects in fullerenes, MgB<sub>2</sub>, ruthenates, ferropnictides, and other novel noncuprate superconductors
- Routes to higher temperature superconductivity

Before submission, authors should carefully read over the journal's Author Guidelines, which are located at <http://www.hindawi.com/journals/acmp/guidelines.html>. Prospective authors should submit an electronic copy of their complete manuscript through the journal Manuscript Tracking System at <http://mts.hindawi.com/>, according to the following timetable:

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First Round of Reviews	September 1, 2009
Publication Date	December 1, 2009

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