SUNG KYUN KWAN UNIVERSITY(SKKU)

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Key Words

Theory of unconventional superconductivity, Interplay between superconductivity and other orders, Numerical analysis of angle-resolved photo-emission spectroscopy (ARPES) and other spectroscopy data

Research Area

The research of my group is focused on the theory of high temperature superconductivity. A major topic is the pairing mechanism of the high Tc superconductivity. We have been working to determine the experimental constraints from high resolution ARPES data that any viable theory of high Tc superconductivity must satisfy. This will differentiate among many proposed ideas to settle the problem down. Other topics of my group are variations on the theme of high Tc superconductivity pairing interaction.

Education

- 1989 June PhD University of Pennsylvania
- 1984 Feb MSc Seoul National University
- 1982 Feb BSc Seoul National University

Experience

- 1989 Sep - 1992 Feb Research Associate, University of Rochester & Xerox Webster Research Center, USA
- 2006 Sep - Dec Visiting Professor, University of California
- 1999 Feb - Aug Visiting Professor, University of Paris
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Position

- 2014 Apr - present Executive Director, Asia Pacific Center for Theoretical Physics
- 1992 Mar - present Professor, Department of Physics, SKKU
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Selected Publication

- J. M. Bok, J. J. Bae, H.-Y. Choi, C. M. Varma, W. Zhang, J. He, Y. Zhang, L. Yu, X. J. Zhou, Quantitative determination of pairing interactions for high-temperature superconductivity in cuprates, Science Advances **2**, e1501329 (2016).
- Sharp low energy feature in single-particle spectra due to forward scattering in *d*-wave cuprate superconductors, Physical Review Letters **113**, 057001 (2014).
- Coexistence of two sharp-mode couplings and their unusual momentum dependence in the superconducting state of $Bi_2Sr_2CaCu_2O_{8+\delta}$ revealed by laser-based angle-resolved photoemission", Physical Review Letters **111**, 107005 (2013).
- Comments on the *d*-wave pairing mechanism for cuprate high *T*c superconductors: Higher is different?, Journal of Korean Physical Society **60**, 978-986 (2012).
- Analysis of laser angle-resolved photoemission spectra of $Bi_2Sr_2CaCu_2O_{8+\delta}$ of in the superconducting state: Angle-resolved self-energy and the fluctuation spectrum, Physical Review B **84**, 104521 (2011).
- Interplay between spin density wave and π-phase-shifted superconductivity in the iron pnictide superconductors, Physical Review B **82**, 174508 (2010).
- Momentum Dependence of the Single-Particle Self-Energy and Fluctuation Spectrum of Slightly Underdoped $Bi_2Sr_2CaCu_2O_{8+\delta}$ from High Resolution Laser ARPES, Physical Review B **81**, 174516 (2010).
- Impurity effects on the ±*s*-wave state of the iron-based superconductors, Physical Review B **79**, 054529 (2009).

Others