

CHOI Han-Yong

Professor
Department of Physics



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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 T_c superconductivity. We have been working to determine the experimental constraints from high resolution ARPES data that any viable theory of high T_c 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 T_c 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 $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ 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 $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ of in the superconducting state: Angle-resolved self-energy and the fluctuation spectrum, *Physical Review* **B84**, 104521 (2011).
- Interplay between spin density wave and π -phase-shifted superconductivity in the iron pnictide superconductors, *Physical Review* **B82**, 174508 (2010).
- Momentum Dependence of the Single-Particle Self-Energy and Fluctuation Spectrum of Slightly Underdoped $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ from High Resolution Laser ARPES, *Physical Review* **B81**, 174516 (2010).
- Impurity effects on the $\pm s$ -wave state of the iron-based superconductors, *Physical Review* **B79**, 054529 (2009).

Others