

Principal Researcher	Takashi Takahashi			Number of Researchers	3	
Research Institution · Department · Title	Professor , Department of Physics , Tohoku University			Location of Institution	Sendai	
Title of Project	Development of Ultrahigh-Resolution Photoemission Spectrometer and Research of High-Tc Quasiparticles					
Abstract of Research Project	<p>It is fifteen years since high-temperature (high-T_c) superconductor was discovered. Meanwhile the application to industry and medicine has been steadily progressed. On the other hand, the mechanism (origin) of superconductivity has not yet been finally elucidated despite of many theoretical and experimental studies. Photoemission spectroscopy, which utilizes the external photoelectric effect, has provided many important knowledge on the relation between the electronic structure and the superconducting mechanism, such as Fermi surface, superconducting gap, and pseudogap. Recent remarkable progress in the resolution has further enabled the direct observation of "quasiparticle", the origin of superconductivity, near the Fermi level. In this research project, we develop/construct an ultrahigh-resolution photoemission spectrometer which achieves the world-highest-level energy and momentum resolutions. Using this spectrometer, we challenge to directly observe the high-T_c quasiparticle as well as to measure the detailed character as a function of temperature and doping, leading to the final goal of elucidation of the mechanism (origin) of high-T_c superconductivity. The research is original and challenging in the solid-state physics field and the result is expected to open a way to search of new novel superconductors.</p>					
References	<p>T. Sato, T. Kamiyama, T. Takahashi, K. Kurahashi, and K. Yamada, "Observation of dx²-y²-like superconducting gap in an electron-doped high-temperature superconductor", Science 291 (2001) 1517-1519.</p> <p>H. Ding, T. Yokoya, J. C. Campuzano, T. Takahashi et al., "Spectroscopic evidence for a pseudogap in the normal state of underdoped high-T_c superconductors", Nature 382 (1996) 51-54.</p>					
Term of Project	Fiscal years 2002-2005. (4years)					
Budget Allocation (in thousand of yen)	FY2002	FY2003	FY2004	FY2005	FY2006	TOTAL
	38,000	20,600	18,200	7,300	0	84,100
Homepage Address	http://arpes.phys.tohoku.ac.jp/					