

【Abstract of 2008 Grant – in – Aid for Scientific Research on Innovative Areas
(Research in a proposed research area)】

Title of project	Emergence of Heavy Electrons and Their Ordering
Head Investigator Name	Kazuo Ueda
Abstract of Research Project	“Heavy electron states” emerge in rare-earth and actinide compounds, when f electron exhibits huge effective mass which is a few hundred or thousand times as large as the bare electron mass. Thus far, the heavy electron state has been comprehensively understood by the competition between itinerant and localized nature of f electron. However, in order to understand new superconductivity and magnetism which have been recently discovered in heavy electron systems, it is essentially important to consider multi degrees of freedom such as f-electron orbital and anharmonic phonon (rattling) in addition to spin and charge. In this innovative research area, we will develop heavy-electron research on the system characterized by new elements of multi degrees of freedom in combination with traditional concept of the competition between the itinerant and localized nature of f electron. The target of this project is to establish new concepts of superconductivity and magnetism through the direct observation of heavy electron state, understanding of electron-rattling state, and exploring exotic superconductivity and novel multipole ordering.
Term of Project: 2008–2012	