

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Fluctuation exchange theory for superconductivity of  $f$ -electron systems with multipole degrees of freedom** KATSUNORI KUBO, TAKASHI HOTTA, Advanced Science Research Center, Japan Atomic Energy Agency — Recently, an interesting possibility of superconductivity induced by multipole fluctuations has been discussed in some  $f$ -electron materials. In order to clarify such exotic superconductivity from a microscopic viewpoint, we apply fluctuation exchange (FLEX) approximation to an  $f$ -electron model with active orbital degree of freedom on the basis of a  $j$ - $j$  coupling scheme. In this study, we consider a square lattice, for simplicity. First, we evaluate orbital dependent fluctuations and effective pairing interactions within the FLEX approximation. Then, we determine the symmetry of the gap function among possible superconducting states by solving the Eliashberg equation. In particular, we pay our attention to the effect of crystalline electric field on the appearance of superconductivity. By further decomposing complex orbital dependent fluctuations into multipole components, we also discuss possible relevance of multipole fluctuations to exotic superconductivity.

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Date submitted: 28 Nov 2005

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