Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Symmetry of Photoexcited States in Two-Dimensional Mott Insulators TAKAMI TOHYAMA, Institute for Materials Research, Tohoku University — The charge gap in Mott insulators is a consequence of strong electron correlation represented by large on-site Coulomb interaction. The correlation induces novel phenomena in terms of the interplay of charge and spin degrees of freedom. In this study, we examine symmetry of photoexcited states with two photoinduced carriers in two-dimensional Mott insulators by applying the numerically exact diagonalization method to finite- size clusters of a half-filled Hubbard model in the strong- coupling limit [1]. The symmetry of minimum-energy bound state is found to be s-wave, which is different from a $d_{x^2-y^2}$ wave of a two-hole pair in doped Mott insulators. We demonstrate that the difference is originated from an exchange of fermions due to the motion of a doubly occupied site. Correspondingly large-shift Raman scattering across the Mott gap exhibits a minimum-energy excitation in the A_1 (s-wave) channel. We discuss implications of the results for the Raman scattering and other optical experiments. [1] T. Tohyama, cond-mat/0508519.

Takami Tohyama
Institute for Materials Research, Tohoku University

Date submitted: 24 Nov 2005 Electronic form version 1.4