Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Ordered states and Mott states of three-component fermionic atoms in optical lattices at finite temperatures SEI-ICHIRO SUGA, Univ of Hyogo, KENSUKE INABA, NTT Basic Research Labs., JST-CREST — We systematically investigate the properties of three-component (color) fermionic atoms in optical lattices using a two-site dynamical mean field theory and a self-energy functional approach. For the attractively interacting systems, we obtain the finite-temperature phase diagram for the color superfluid (CSF), trionic state, and Fermi liquid [1]. We find that as the anisotropy of the attractive interactions increases, the CSF region extends owing to the suppression of the trion formation. We also investigate the repulsively interacting system. We show that even at incommensurate filling the Mott transition occurs for the anisotropic interactions and that two kinds of Mott states appear, which are characteristic of the three-component systems [2]. The finite-temperature phase diagram is also determined. We demonstrate that such exotic Mott states can be detected in experiments by, e.g., the photoassociation loss measurements.

[1] K. Inaba and S. Suga, *Phys. Rev. A* **80**, 041602(R) (2009).
[2] S. Miyatake, *et al.*, *Phys. Rev. A* **81**, 021603(R) (2010); K. Inaba, *et al.*, *ibid.* **82**, 051602(R) (2010).

Sei-ichiro Suga
Univ of Hyogo

Date submitted: 04 Feb 2011 Electronic form version 1.4