

Abstract Submitted
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Photo-induced topological phase transitions in the Hubbard model on honeycomb lattice TAKAHIRO MIKAMI, NAOTO TSUJI, HIDEO AOKI, Department of Physics, University of Tokyo — “Floquet topological states” as first proposed by Oka and Aoki [1] are attracting much attention, where Dirac electrons in circularly polarized ac-fields undergo a nonequilibrium transition to topological stationary states with a photo-induced Hall effect in zero magnetic field. Such a transition has indeed been observed recently by a detection of the Floquet band structure on the surface of a topological insulator [2]. In equilibrium, on the other hand, electron correlation has been suggested to produce rich phases on honeycomb lattice. Hence it should be interesting to study what effects the electron correlation can exert on the photo-induced topological transitions. This has motivated us to study of the Hubbard model on honeycomb lattice in circularly polarized ac-fields. For this we have implemented the Floquet DMFT method[3]. We have indeed obtained a novel phase diagram, where most notably (i) there is a lobe structure between the topological and Mott phases and also (ii) a topological-topological transition with a change in the Chern number.

[1] T. Oka and H. Aoki, Phys. Rev. B 79, 081406(R) (2009)

[2] Y. H. Wang, et al., Science 342, 453 (2013)

[3] N. Tsuji, et al., Phys. Rev. Lett. 103, 047403 (2009)

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