Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Dislocations in the Kitaev honeycomb model[1] OLGA PETROVA,
OLEG TCHERNYSHYOV, Johns Hopkins University — We study the effects of
introducing dislocations into the Kitaev honeycomb model [1]. In the gapped phase,
dislocations are Z_2 "twist defects" associated with the transmutation of electric and
magnetic excitations, studied previously in the context of Z_N rotor models [2,3]. We
show that each dislocation hosts one unpaired Majorana mode. As a consequence,
twist defects have the statistics of Ising anyons. Because dislocations are confined,
an additional phase is accumulated due to the change in system's energy during the
braiding process. This means that the result of braiding can only be defined up to
a phase. Therefore, twists are said to have projective non-Abelian statistics.

[1] Alexei Kitaev, Annals of Physics **321**, 2 (2006)
[2] Hector Bombin, Phys. Rev. Lett. **105**, 030403 (2010)
[3] Yi-Zhuang You and Xiao-Gang Wen, Phys. Rev. B **86**, 161107 (2012)

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Date submitted: 11 Dec 2012   Electronic form version 1.4