

# Raman Scattering Approach to the $\mathbb{Z}_2$ Gauge Theory in the Kitaev Model

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The Kitaev honeycomb model can be viewed as a system consisting of Majorana fermions coupled to a  $\mathbb{Z}_2$  gauge field, for which the accompanied  $\mathbb{Z}_2$  vortex is called the vison. Recently, a study introduced a Green's function approach to analytically compute the energy cost of generating a vison in the Kitaev honeycomb model. On the other hand, some studies proposed that the Raman scattering method can be applied to investigate the Kitaev spin liquid. Based on These approaches, we can delve deeper into the system's characteristics when two visons recombine through the formation of a loop, which may reflect the information about the self statistics of visons in the Kitaev model. This study offers further insights into the  $\mathbb{Z}_2$  gauge theory within the Kitaev spin liquid.

**Primary authors:** Mr WANG, Chen-Chih (Department of physics, National Tsing Hua University); Prof. HUANG, Yi-Ping (Department of physics, National Tsing Hua University)

**Presenter:** Mr WANG, Chen-Chih (Department of physics, National Tsing Hua University)

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