**Quantized Signature of Majorana Fermion:**

**Particle being its own Anti-particle\***

Kang L. Wang

Distinguished Professor and Raytheon Chair Professor

Departments of ECE, MSE and Physics

*University of California, Los Angeles, CA 90095, USA,* [*wang@seas.ucla.edu*](mailto:wang@seas.ucla.edu)*; P: 310-825-1609*

**Abstract**

In 1937, Ettore Majorana proposed a particle being its antiparticle. Since its inception, Majorana has been under intensive pursuit both theoretically and in experiments. Recent interest in robust topologically protected quantum computing has accelerated the experimental quest of Majorana. Among various proposals, I will discuss the scenario when a topological insulator meets a superconductor. This system offers a possible host for Majorana. The talk will begin from the experimental effort of the quest of dissipationless transport: quantum Hall without magnetic field, quantum spin Hall to quantum anomalous Hall (QAH). The latter was enabled by a long term effort in the materials growth of topological insulator - magnetic (Cr) doped BiSbTe to achieve reliably QAH. The recent work of topological insulator (TI) has led to the recognition of the importance of topology phase in condensed matters by the 2016 Nobel Prize in Physics. I will discuss the topological transitions of Dirac electrons for TI in QAH. When the QAH edge states interface with a superconductor, the Dirac electron space is transformed to the Nambu space, hosting Majorana fermions via pairing energy. We will describe our experimental efforts to show the convincing evidence of quantized signature of the one-dimensional chiral Majorana fermion [1]. A half-integer quantized conductance plateau (0.5 e2/h) gives a firm signature of the elusive Majorana fermion for the first time by scanning topological phase transitions under the reversal of the magnetization. This finding gives a new direction for new topological quantum computing.

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A short biography:

****Dr. Kang L. Wang is currently Distinguished Professor and the Raytheon Chair Professor in Physical Science and Electronics in the University of California, Los Angeles (UCLA). He is affiliated with the Departments of ECE, MSE and Physics. He received his BS degree from National Cheng Kung University (Taiwan) and his MS and PhD degrees from the Massachusetts Institute of Technology. He is a Member of Academia Sinica, Fellow of the IEEE, and a member of the American Physical Society. He was a Guggenheim Fellow. He also served as Editor-in-Chief of IEEE TNANO, editor of Artech House, Consulting Editor for Spins, and Associate Editor for Science Advances. His research areas include nanoscale physics and materials; topological insulators; molecular beam epitaxy; spintronics and low dissipation devices; neurodynamics and neurotronics.