# Manipulation of Majorana bound states in proximity to a quantum ring with Rashba coupling

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The quest for Majorana zero modes in the laboratory is an active field of research in condensed matter physics. In this regard, there have been many theoretical proposals. However, their experimental detection remains elusive. In this article, we present a realistic setting by considering a quantum ring with Rashba spin-orbit coupling and threaded by a magnetic flux, in contact with a topological superconducting nanowire. We focus on spin-polarized persistent currents to assess the existence of Majorana zero modes. We find that the Rashba spin-orbit coupling allows for tuning the position of the zero modes and has sizable effects on spin-polarized persistent currents. Our results pave the way towards probing the existence of Majorana zero modes.

## REFERENCES

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## FIGURES

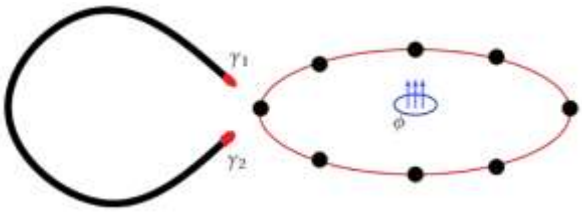


**Figure 1:** Sketch of a quantum ring threaded by a magnetic flux interacting with two Majorana bound states at the end of a p-wave superconducting wire.

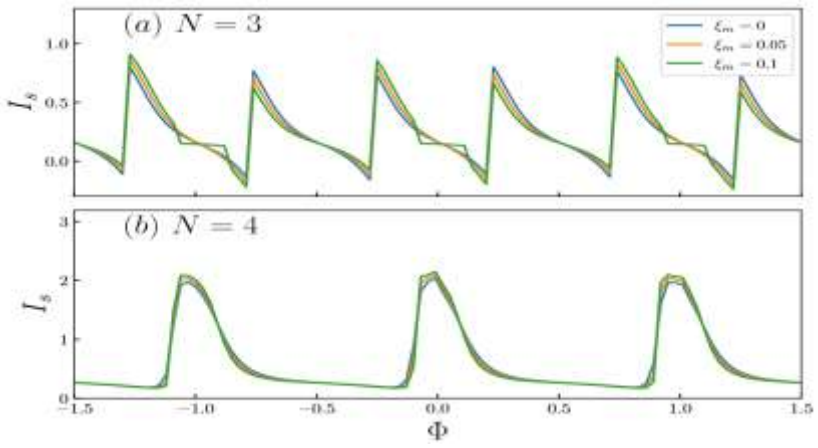


**Figure 2:** Spin persistent currents for (a) N=3 and (b) N=4 site ring with Rashba spin-orbit interaction, interacting with two Majorana bound states. Colours are used to indicate the interaction between the two Majorana bound states.