

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

A tunable Josephson current in a Rashba Ring by Aharonov-Casher Phase XIN LIU, MARIO F. BORUNDA , XIONG-JUN LIU, JAIRO SINOVA¹, Department of Physics, Texas A&M University, College Station, TX 77843-4242, USA, JAIRO SINOVA'S GROUP AT TAMU TEAM — We study the interference effect induced by the Aharonov-Casher (A-C) phase on the transport between an asymmetrically confined two-dimensional electron ring system and the superconducting leads of a Josephson junction. The Josephson current and the Andreev levels are studied both analytically and numerically. Our results also predict oscillations in the Josephson current due to the A-C phase in the ring that can be tuned electrically via the spin-orbit (SO) interaction. Based on these oscillations, we propose a novel mechanism to observe the A-C phase in mesoscopic rings with gate tunable SO interaction attached to superconducting leads using the Josephson current oscillations. An applicable method to control the Josephson current by a tunable gate voltage can be realized due to these phenomena.

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Date submitted: 18 Nov 2008

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