Second Laureate
Fundamental Research

Project Title: Fabrication technique and implementation of soliton devices based on Josephson junction
Executive Organization: Malek Ashtar University of Technology
Researcher: Dr. Farshid Raeesi
Collaborators Organization: Khawja Nasir al- Din Tusi University of Technology & Yar-Nikan Saleh

Abstract:

Soliton devices are new category of electronic devices based on superconductive Josephson junction. In these devices, solitons and anti-solitons are carriers, such as electrons and holes in semiconductor devices. These electromagnetic waves velocity is in the scale of speed of light in the media and much faster in comparison to electrons movements. High speed digital circuits, high frequency communication systems, millimeter and sub-millimeter waves imaging can be implemented by these devices.

Soliton diode is the basic building block element for Josephson fluxonic devices and it is fabricated in this project by two technologies. These devices have been successfully tested for detection of high frequency electromagnetic waves.

Native development of fabrication of soliton devices from the idea, design and native fabrication process equipments such as lithography, deposition, dry etching systems in addition to achieving very low temperature technology, are some achievements of this project.