



A Study of high-Tc Superconductor Submicron Josephson Junction Devices

By Shrikant Saini

LAP Lambert Academic Publishing Sep 2012, 2012. Taschenbuch. Book Condition: Neu. 220x150x6 mm. This item is printed on demand - Print on Demand Neuware - Depending on in-plane size, the application of Josephson junctions varied from the terahertz (THz) oscillator to the single electron transistors. This book is focused on the study of submicron Josephson junctions fabricated in high-temperature superconductors (HTS). The unit cell of layered HTS show intrinsic Josephson junctions (IJJs) phenomenon. The Cooper pair tunneling in the IJJs can be affected by quantum phase fluctuations when the resistance of a submicron stack is in the range of quantum resistance. To observe this quantum effect, stacks of IJJs of various in-plane area down to submicron range have fabricated in Bi-2212 single crystal whiskers using three-dimensional focused ion beam etching technique. Submicron stacks show a strong suppression in critical current density. The possible mechanisms for this suppression are discussed and the data analysis points to the quantum phase fluctuations as the most likely mechanism of this effect. Furthermore submicron stacks of a-axis oriented multi layered thin film of YBa₂Cu₃O₇ and PrBa₂Cu₃O₇ (Y123/Pr123) Josephson junctions are studied in presence of external microwave irradiation. 92 pp. Englisch.



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