411

Accession number:12929387

Title:Cryogenic harmonic phase detector

Authors:Kalashnikov, K.V. (2); Khudchenko, A.V. (1); Koshelets, V.P. (1)

Author affiliation:(1) Kotelnikov Inst. of Radio Eng. & amp; Electron., Moscow, Russia; (2)

Moscow Inst. of Phys. & amp; Technol., Dolgoprudnyi, Russia

Source title:Nonlinear World

Abbreviated source title:Nonlinear World (Russia)

Issue:10

Publication date:2012

Pages:125-6

Language:Russian

ISSN:2070-0970

Document type: Journal article (JA)

Publisher:Editorial Department of Nonlinear World

Country of publication:Russia

Material Identity Number: GF58-2012-008

Abstract: A novel superconducting element, high-harmonic phase detector (HPD), intended for phase-locking of a flux flow oscillator (FFO) in a superconducting integrated receiver (SIR) has proposed and experimentally tested. According to our been concept a superconductor-insulator-superconductor (SIS) junction is implemented both for down-conversion of the FFO frequency and for phase-locking of the FFO to an external reference. The regulation bandwidth (BW) of the phase-locking loop (PLL) system based on the HPD as wide as 70 MHz has been measured experimentally; that value several times exceeds the BW of regular PLL systems used for cryogenic oscillators. New PLL system based on HPD synchronises up to 92% of the emitted FFO power (this parameter is called the spectral ratio, SR) for free running FFO line as wide as 12 MHz The HPD PLL system is simple and compact, therefore it is very promising for future SIR applications, especially for building multi-pixel SIR arrays and for phase-locking of the THz range FFO.

Number of references:5

Inspec controlled terms:cryogenic electronics - oscillators - phase detectors - phase locked loops - superconducting devices

Uncontrolled terms:cryogenic harmonic phase detector - superconducting element - high-harmonic phase detector - flux flow oscillator - superconducting integrated receiver - superconductor-insulator-superconductor junction - FFO frequency down-conversion - FFO phase-locking - regulation bandwidth - cryogenic oscillators - FFO power - spectral ratio - free-running FFO line - HPD PLL system - multipixel SIR arrays - THz-range FFO - phase-locking loop

Inspec classification codes:B1250 Modulators, demodulators, discriminators and mixers - B1230B Oscillators - B3240R Superconducting receivers and detectors

Treatment:Practical (PRA)

Discipline:Electrical/Electronic engineering (B)

Database:Inspec

IPC Code:H03BCopyright 2012, The Institution of Engineering and Technology