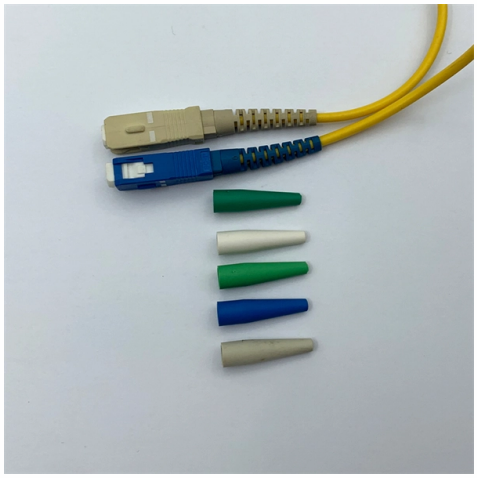
Raman Amplifier Noise Figure Formula



Overview

Basic Formulae for Noise Figure The basic formula for NF is the ratio of SNR at the input of an amplifier to the SNR at the output of an amplifier. SNR= signal power / noise power (2)Why is the noise from the first stage of an amplifier chain the most important?

Which types of optical amplifiers can reach the 3-dB quantum limit?

Can an amplifier have a noise figure below 3 dB?

The noise factor F of an (electronic or optical) amplifier is a measure of how much excess noise the. Abstract: Raman amplification is based on stimulated raman scattering (SRS). Raman amplifiers are widely used for high capacity communication systems. The main reason for which it can be used is its excellent noise figure. The impact of two-photon absorption (TPA) and free-carrier scattering on the noise figure is quantified using the quantum formulation of the Langevin approach. It is found that TPA-induced. A Raman amplifier is an optical amplifier based on Raman gain, which results from the effect of stimulated Raman scattering in some Raman gain medium. That medium is often an optical fiber (possibly a highly nonlinear fiber), although it can also be a bulk crystal, a waveguide in a photonic. The noise figure is expressed in decibels (dB) and is derived from the noise factor, which is the ratio of the output noise power to the input noise power, adjusted for the amplifier's gain. The noise factor measures the degradation of the signal-to-noise ratio (SNR) as a signal passes through an. Abstract—In this paper, we experimentally and theoretically show the improvement in noise characteristics in a distributed Raman amplifier (DRA) system for wavelength division multiplexing (WDM) transmission, utilizing our proposed pumping technique.

Article Content

Raman Amplifiers – fiber amplifier, Raman gain, noise figure

Raman fiber amplifiers can have a lower noise figure. On the other hand, they more directly couple pump noise to the signal than laser amplifiers do. They also have a fast reaction to changes in the

Raman Amplifier Calculator

Calculate distributed Raman amplifier parameters including on-off gain, net gain accounting for fiber loss, effective length, and noise figure. Raman amplification uses nonlinear optical effects to amplify

Optimal Noise Figure for Raman-assisted Fiber Optical Parametric Amplifiers

Abstract – The noise figure of a Raman-assisted fiber optical parametric amplifier is reduced to 3.6 dB by using a fiber Bragg grating to suppress input parametric pump noise.

Intrinsic noise figure derivation for fiber raman amplifiers from ...

A complete analysis and measurement of the noise figure of Raman amplifiers is reported. The standard noise figure definition derived from the amplified spontaneous emission approach is discussed. A

Noise Figure

The noise figure is expressed in decibels (dB) and is derived from the noise factor, which is the ratio of the output noise power to the input noise power, adjusted for the amplifier''s gain.

Gain and Noise Performance of Fiber Raman Amplifiers

Arab Academy for Science, Technology and Maritime Transport, Egypt Abstract— This work presents a study to obtain the gain and noise figure of fiber Raman amplifiers (FRAs) by the two coupled

Gain and Noise Performance of Fiber Raman Amplifiers

Abstract and Figures This work presents a study to obtain the gain and noise figure of fiber Raman amplifiers (FRAs) by the two coupled equations

Reducing Noise Figure and Nonlinear Penalty in Distributed Raman ...

We show that forward (Fwd) pumping is clearly superior to backward (Bwd) pumping in terms of noise figure (NF) defined by amplified spontaneous emission (ASE) noise and gain. We also show that bi

Gain and Noise Figure of Raman Amplifier.

A hybrid configuration of Raman amplifier and erbium-doped fiber amplifier (EDFA) is proposed to obtain a better performance in term of gain, noise figure and flat

(PDF) Noise figure of distributed Raman amplifier with different ...

This paper presents the gain and noise figure optimization of distributed Raman fiber amplifier in S–band for single-mode fiber (SMF) and dispersion-shifted fiber (DSF) by using WDM

Distributed fiber Raman amplifiers: analytical expression of noise ...

Abstract Aiming at qualitative study, analytical expressions of equivalent noise figure (ENF) and other noise characteristics of distributed fiber Raman amplifier (DFRA) are derived,

Noise Figure

Noise figure is a critical parameter in optical fiber communications, affecting the performance of erbium-doped fiber amplifiers, fiber Raman amplifiers, and semiconductor optical amplifiers.

A Review Paper on Improvement in Gain and Noise Figure in Raman ...

Abstract:- Raman amplifiers has been found to be an attractive candidate for optical dense wavelength division multiplexing system related applications. In the design of Raman amplifier, determination of

Noise figure

Noise figure Noise figure (NF) and noise factor (F) are figures of merit that indicate degradation of the signal-to-noise ratio (SNR) that is caused by components in a signal chain. These figures of merit are

Analysis of Noise Figure of Fiber Raman Amplifier

The source of noise and its effects on the noise figure is discussed and the methods to reduce the noise figure are given. In this paper noise figure of Raman amplifiers is studied and analyzed for different

Raman Amplifier and Negative noise figure analysis

In both cases noise figure captures the signal-to-noise penalty a device imposes between its input and output, but the physical origin of that penalty is what separates an EDFA from

New model of noise figure and RIN transfer in fiber Raman amplifiers

A new and complete analysis of noise figure and pump noise transfer in fiber Raman amplifiers is reported. Our approach is based on vacuum fluctuation which is the minimum level of the optical

Noise figure of distributed Raman amplifier with different pumping ...

The noise figure (NF) is defined as the ratio of the signal to noise ratio (SNR) at the input to that at the output of the amplifier. It is always greater than unity due to the fact that the amplifier

ASE Noise in Raman Amplifiers: Pump Depletion Impact

Raman fiber amplifiers (RFAs) are known as stable high power fiber light sources providing almost any wave-length in the near IR range. This is due to their broad gain spectrum, low noise characteristics,

Reducing Noise Figure and Nonlinear Penalty in Distributed Raman ...

Abstract—In this paper, we experimentally and theoretically show the improvement in noise characteristics in a distributed Raman amplifier (DRA) system for wavelength division multiplexing

(PDF) Noise Figure of Silicon Raman Amplifiers

In this paper noise figure of Raman amplifiers is studied and analysed for different pumping schemes. The main sources of noise and their effects on the noise figure are discussed and...

Lecture 8: Intro to Optical Amplifiers

980 nm pump: Complete population inversion -> Low noise figure 1480 nm pump: Low population inversion -> high quantum efficiency in converting pump photons to signal photons

A low noise-figure hybrid optical amplifier by using second-order ...

A low noise figure and high and flat gain are advantages of second-order Raman amplifiers over first-order amplifiers. There are various ways to implement second-order Raman

Noise Figure of Silicon Raman Amplifiers

Abstract—The noise figure of silicon Raman amplifiers in the presence of nonlinear losses is calculated. The impact of two-photon absorption (TPA) and free-carrier scattering on the noise figure is

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