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2P15 - Operation of a Gyromagnetic Line with Magnetic Axial Bias

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A growing interest has been rising around the use of Gyromagnetic Nonlinear Transmission Lines (GNLTLs) for Radiofrequency (RF) generation since recent results that were published has demonstrated great prospects for this end. The interest on this type of transmission line comes from the high RF conversion efficiency around 20.0% according to some works already elaborated, what shows a great capability of operates in a frequency range with considerable value, between 300.0 MHz and 6.0 GHz. The focus of this type of research is for the development of systems with greater reliability, efficiency and of course cheaper than those that already exist. Several authors used different approaches to study the gyromagnetic effect in order to understand the electron magnetic dipole precession movement of the ferromagnetic material, responsible for compress the pulse oscillation. The model proposed and studied here to analyze the GNLTL has a coaxial structure using NiZn ferrite beads distributed in a 20-cm coaxial line, for low and high voltage operation. Different measurements are compared in order to check the influence of the voltage injected onto the input, as well as the influence of the medium in which the coaxial line is and the use of a solenoid to create an axial magnetic bias. This work aimed the oscillation generated at the output caused by the presence of a magnetic field and by the changes in the system setup. For this, we analyzed the GNLTL behavior according to the results obtained from experimental tests, in order to observe the frequency response when the axial bias is present. It is expected that the results presented here will be useful as a basis to develop a system capable of generating RF for the use in space and mobile defense platforms.

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Authors: YAMASAKI, Fernanda (INPE); ROSSI, Jose (National Institute for Space Research); Dr GONÇALVES LOPES RANGEL, Elizete (INPE); SCHAMILOGLU, Edl (University of New Mexico); Mr CARVALHO SILVA, Leandro (INPE)

Presenters: YAMASAKI, Fernanda (INPE); ROSSI, Jose (National Institute for Space Research); SCHAMILOGLU, Edl (University of New Mexico)

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