"Investigation of the dispersive properties of photo[...] high-power microwaves

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Abstract
Summary form only given, as follows. Photonic crystals dimensional, metallic or dielectric periodic structures tha stop bands in their frequency response. They are poten components for a wide variety of applications. We prese characterization of the dispersive properties of PCs usir microwaves (HPMs). The advantage of high power chai ability to measure decaying waves in the attenuating sto It is anticipated that the HPM characterization will provic noise ratio than conventional low-power characterizatio 6 driven backward-wave oscillator (BWO) is used to ger microwave pulse at 9.65 GHz. Two dielectric PCs were experiments. The first crystal had a stop band centered frequency of the BWO. The second crystal had a pass b frequency. Using the two crystals, the temporal evolutio properties of the PC is investigated leading to advancec design of PCs for use in pulsed applications

Index Terms
Inspec

Controlled Indexing
backward wave oscillators electromagnetic wave microwave oscillators

Non-controlled Indexing
9.65 GHz Sinus-6 driven backward-wave oscillat periodic structures dispersive properties high-p microwaves low-power characterization scheme periodic structures photonic crystals signal-to-n three-dimensional structures

Author Keywords
Not Available

References

using compact precision motors. This capability will then facilitate the use of a robust controller to achieve various control objectives. In particular, the preliminary design of a controller to i) maximize the frequency bandwidth for a given constant power output, ii) maximize the power radiated at a given frequency in the bandwidth, and iii) maximize the beam-to-peak microwave power conversion efficiency will be presented.

[1] L.D. Moreland, E. Schamiloglu, R.W. Lemke, A.M. Roitman, S.D. Korovin, and V.V. Rostov, "Enhanced Frequency Agility of High Power Relativistic Backward Wave Oscillators," IEEE Trans. Plasma Sci. **24**, 852 (1996).

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3B09

*Investigation of the Dispersive Properties of Photonic Crystals Using High-Power Microwaves

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Photonic crystals (PCs) are three-dimensional, metallic or dielectric periodic structures that exhibit pass and stop bands in their frequency response. They are potentially useful components for a wide variety of applications. We present the characterization of the dispersive properties of PCs using high-power microwaves (HPMs). The advantage of high power characterization is the ability to measure decaying waves in the attenuating stop bands of the PCs. It is anticipated that the HPM characterization will provide higher signal-to-noise ratio than conventional low-power characterization schemes. A Sinus-6 driven backward-wave oscillator (BWO) is used to generate a 10 nsec microwave pulse at 9.65 GHz. Two dielectric PCs were fabricated for these experiments. The first crystal had a stop band centered about the excitation frequency of the BWO. The second crystal had a pass band at the source frequency. Using the two crystals, the temporal evolution of the dispersive properties of the PC is investigated leading to advanced concepts in the design of PCs for use in pulsed applications.

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Tuesday Morning, 20 May 1997
10:00 a.m. – Toucan Room

Oral Session 3C:
3.2 Intense Ion and Electron Beams
Chair: P.R. Menge

3C01

Development of a High-Brightness, Applied-B Lithium Extraction Ion Diode for Inertial Confinement Fusion*

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The light ion fusion program is pursuing the development of a high brightness lithium ion beam on the SABRE accelerator at Sandia (6 MV, 0.25 MA). This will require the integration of at least three conditions: 1) an active, pre-formed, uniform lithium plasma ion source, 2) modification of the electron sheath distribution in the AK gap, and 3) mitigation of undesired electrode plasmas. These experiments represent the first attempt to combine these three conditions in a lithium ion diode. Our primary goal is the production of a lithium beam with a micro-divergence at peak ion power of ≤ 20 mrad, about half the previous value achieved on SABRE. A secondary goal is reduction of the impedance collapse rate. Our primary approach is a laser-produced lithium plasma generated with 10 ns YAG laser illumination of LiAg films. Laser fluences of 0.5 - 1.0 J/cm^2 appear to be satisfactory to generate a dense, highly ionized, low temperature plasma. An ohmically-generated, thin-film ion source is also being developed as a backup, longer term approach. Small-scale experiments are performed to study each ion source in detail, prior to fielding on the accelerator. Pre-formed anode plasmas allow the use of high magnetic fields (Vcrit/V ≥2) and limiters which slow the onset of a high