# Compact Electrooptically Q-Switched Partial Z-fold $CO_2$ Waveguide Laser With Two Channels

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## ABSTRACT

An experimental investigation of a pulsed electrooptically Q-switched radio-frequency partial Z-fold waveguide $CO_2$ laser with two channels is presented. The heterodyne frequency stability is analyzed in theory. Q-switched pulses are obtained from the partial Z-fold channel .The peak power is 730W and the pulse width is 150 ns. CW laser can output from the single channel. The laser output directions are opposite.

**Key words:** partial Z-fold , two-channel RF waveguide $CO_2$ laser, electrooptically Q-swithing

## 1. INTRODUCTION

Electrooptically Q-switched $CO_2$ waveguide laser has been found widespread application as a compact infrared source in portable system [1]. For certain applications, notably imaging laser radars, pulsed operation at high repetition frequencies (PRF) is desirable [2-4]. With this application in mind, we designed and tested an electrooptically Q-switched partial Z-fold $CO_2$ waveguide laser with two channels for the first time. The laser output directions from the two channels are opposite.

## 2. CONSTRUCTION OF THE LASER

The schematic diagram of the Q-switched laser system is shown in Fig.1. The waveguide structure is based on metal-ceramic sandwich. The laser includes two channels, i.e. partial Z-fold channel and single channel. The two channels are excited by the same RF source and placed within a water–cooled stainless vacuum housing, which

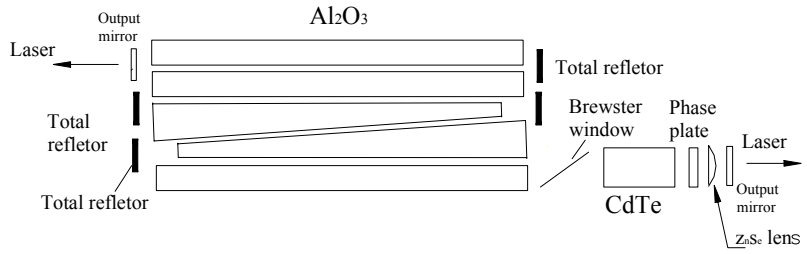


Fig. 1. Structure of the laser



High-Power Lasers and Applications III, edited by Dianyuan Fan, Ken-ichi Ueda, Jongmin Lee, Proceedings of SPIE Vol. 5627 (SPIE, Bellingham, WA, 2005)
0277-786X/05/$15 · doi: 10.1117/12.574625