

Introduction

A TEA CO₂ laser was reported for the first time in 1970 by Beaulieu⁽¹⁾ using many separate transverse discharge between separate pin cathodes and a common bar anode. Since then, there has been considerable activity in the development of high power pulsed CO₂ laser operating at high pressure, especially the work on TEA (Transversely Excited at Atmospheric Pressure) system²⁻⁶. Work has progressed on studies of different preionizing schemes, addition of chemicals to enhance electron density⁷, and miniaturization⁸⁻¹⁰. Due to the laser high output, high efficiency with relatively compact system, it has found many applications in industry, research, defense and pollution monitoring.

It is well known that the output of CO₂ laser depends on the pressure and additional gas mixtures of N₂ and He improves the efficiency and assists in the cooling of the system. However, discharges at high energy inputs or higher CO₂ proportions lead to arcing problem. This problem may be reduced by preionizing the gas mixture uniformly prior to the arrival of main discharge. There are many preionizing schemes, the work reported here utilizes a simple UV spark arrays to initiate volumetric preionization with self-synchronization with the main discharge.