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CHAOS IN AMMONIA USING CW-CO₂ 9R30 LASER BEAM

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ABSTRACT- We have predicted the existence of a new strange attractor. This attractor was generated using Ikeda model and a continuous wave (CW) CO₂ laser with ammonia gas as a nonlinear medium inside a ring cavity. The attractor is presented in the form of the relation between imaginary and real part of the transmitted electric field.

1. INTRODUCTION

Turbulence was for many years one of the hardest problems in many disciplines. In physics, the first decisive attack was made by Ruelle and Takens¹ who suggested that turbulent state can appear not only in fluids, but also in non-equilibrium dissipative systems. Being different from thermal noise, the turbulent state now in question has its origin in the nonlinearity of the system and the resulting instability of orbit in phase space. A state which is erratic in time is called chaotic; the scheme of transition (bifurcation) to this state has been subject of active investigation in the last 10 years² especially in fluids and optics³. In addition to fluid systems nonlinear optical systems also provide typical examples of non-equilibrium physical systems. It is expected that these systems will provide good subjects for the study of turbulence. Among the various system in nonlinear optics, the optical bistable system is one of the typical examples exhibiting chaotic behavior. The first experimental evidence of chaotic