Ref.111 "A Self-Consistent Model for the Copper Vapor Laser Kinetcs Discharge", Cláudio C.Motta, Centro Tecnológico da Marinha/CTMSP - São Paulo-SP, Nilson D.Vieira Jr., Inst. de Pesquisas Energéticas e Nucleares/IPEN/CNEN - São Paulo-SP.

A self-consitent computacional model based on the n-fluids theory was developed to describe the cold plasma, weakly ionized, of the kind usually produced in longitudinaly excited discharge tubes. From this model, one can determine the dynamics of the populations involved in the copper atomic laser transition, for lasers operating in high repetition rates (~5KHz). The model developed takes into account five levels for the buffer gas and nine levels for the copper atom. About fifty process were considered in the plasma dynamics calculations. The model accounts for both radial and temporal dependences of the plasma in a cylindrical geometry (radial mode). The skin penetration effect of the electrical field was explicitly considered and the model could also be applied to either small or large diameters. It is shown that this effect produces a temporally distinct population distribution in the laser levels transitions of the copper atoms, in agreement with the literature. It was also found that there is a limit for the laser tube maximum length due to the existence of a time window for the laser positive gain (100ns).