1056-34-144   **Ericka Mochan*** (`locomochan@yahoo.com`), Department of Biomedical Engineering, 1215 Wilbraham Road, Western New England College, Springfield, MA 01119, and **C Davis Buenger** (`davis.buenger@rice.edu`), Math Department, 6100 S. Main St, Rice University, Houston, TX 77005-1892. *Coexistence of Stable ECM Solutions in the Lang-Kobayashi System.*

The Lang-Kobayashi system of delay differential equations describes the behavior of the complex electric field ε and the inversion N inside an external cavity semiconductor laser. This system has a family of special periodic solutions known as External Cavity Modes (ECMs). It is well known that these ECM solutions appear through saddle-node bifurcations, then lose stability through a Hopf bifurcation before new ECM solutions are born through a secondary saddle-node bifurcation. Employing analytical and numerical techniques, we show that for certain short external cavity lasers the loss of stability happens only after the secondary saddle-node bifurcations, which means that stable ECM solutions can coexist in these systems. We also investigate the basins of these ECM attractors. (Received August 02, 2009)