1114-49-191   **Hien T Tran*** (`tran@math.ncsu.edu`), Department of Mathematics, Campus Box 8205, North Carolina State University, Raleigh, NC 27695, and **Lawrence Ives**, **Michael Read**, **Thuc Bui**, **Adam Attarian**, **William Tallis**, **Cynthia Andujar** and **Virginia Forstall**. *Optimal Design a Doubly Convergent Multiple Beam Electron Gun.*

In this talk we discuss the successful interdisciplinary collaboration between North Carolina State University and Calabazas Creek Research, Inc. (CCR). The joint industrial research project focused on the development of computational tools and processes to design a doubly convergent multiple beam electron gun, which was previously considered impractical. All multiple beam devices designed to date use singly convergent electron guns. This means that the electron beam emitted from each cathode converges about the local beam axis. To overcome the limitation on the lifetime of the cathode a large cathode is used to reduce emission current density. This would imply that the diameter of cavity would have to be sufficiently large to accommodate the electron beams rendering it impractical. In this project, we successfully designed a doubly convergent beam gun, where the cathode is moved radially outward and is angled toward the device axis. This effort, spanning approximately 15 months, identified conceptual approaches and implemented computational tools to solve a complex, three-dimensional problem involving charged particle propagation in non-axisymmetric electromagnetic fields. (Received August 26, 2015)