Abstract Submitted
for the OSS11 Meeting of
The American Physical Society

Cathodoluminescence Study of Undoped and Mn Doped Lithium Tetraborate Crystals Being Developed for Neutron Detection CHRISTINA DUGAN, ROBERT HENGEHOLD, JOHN MCCLORY, Air Force Institute of Technology — Lithium tetraborate or LTB crystals are being developed for possible use in solid state neutron detectors. Already used in thermo luminescence dosimeters, LTB is of interest due to its large cross section for neutron capture by lithium and boron. The reaction between lithium and a neutron produces an alpha particle and tritium. When boron interacts with a neutron an alpha particle and lithium are produced. These reactions are the basis for neutron detection, and a LTB crystal enriched with Mn should show improved efficiency for such detection. There is, however, a lack of fundamental characterization information regarding this useful material, particularly with regard to its electronic configuration. In this study, cathodoluminescent spectroscopy has been used to determine the energy level structure of undoped and manganese doped lithium tetraborate crystals. Measurements were made at various beam energies from 5 to 10 KeV on samples maintained at room temperature. Self trapped exciton emission states are evident in the undoped and Mn doped LTB samples ranging in energies from 2.5 to 4.1 eV.

Robert Hengehold
Air Force Institute of Technology

Date submitted: 14 Mar 2011 Electronic form version 1.4