

MAR06-2005-000049

Abstract for an Invited Paper  
for the MAR06 Meeting of  
the American Physical Society

**Designing the emission of THz Quantum Cascade Lasers with surface plasmon photonic structures.**

ALESSANDRO TREDICUCCI, NEST CNR-INFM and Scuola Normale Superiore

The development of quantum cascade lasers operating at terahertz frequencies is proceeding at a very rapid pace. For their successful practical implementation, specific requirements have now to be addressed, particularly concerning the properties of the emitted radiation. Single-mode THz lasers with distributed feedback resonators have been achieved and a new technique involving surface plasmon gratings has been demonstrated to improve performances. The latter also offers the possibility of constructing distributed Bragg gratings as a replacement for high-reflection coatings or to implement vertical emitting devices. Solutions allowing broad tuneability are examined, either relying on external cavity set-ups or more unconventional external electrical control.