

# **Tunable THz Generation by Short Laser Pulses**

Anil K Malik and Hitendra K Malik

Department of Physics, Indian Institute of Technology Delhi, New Delhi – 110 016,  
INDIA

A theoretical and simulation study has been done for THz generation by direct conversion of an ultra short laser pulse into terahertz radiations. In our mechanism we use two very short laser pulses (one is circularly polarized and other is linearly polarized with same frequency while different amplitude and phases) focused on a gas which tunnel ionizes the gas. The conversion is due to ionization induced excitation in presence of static magnetic field and subsequent transverse transient current because of the presence of residual momentum after passing the laser pulse. Due to this oscillatory current THz radiation is emitted. The directionality of the emitted THz radiation is observed to be controlled by the phase difference of incident fs laser pulses. This mechanism is observed to be very efficient and is able to provide THz radiation with high power level of the order of GW.