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THz generation and the detection on the Dirac-cone surface states in topological insulator Bi_2Se_3 J.-Y. LIN, Institute of Physics, National Chiao Tung University, Hsinchu 30010, Taiwan, C.W. LUO, Department of Electrophysics, National Chiao Tung University, Hsinchu 30010, Taiwan — A terahertz (THz) wave is generated from the (001) surface of cleaved Bi_2Se_3 and Cu-doped Bi_2Se_3 single crystals, using femtosecond pulses of 800 nm. The generated THz power is strongly dependent on the carrier concentration of the crystals, which can be explained by considering the absorption of both surface and bulk states altogether. In particular, the Dirac-cone surface states in Bi_2Se_3 significantly affect the THz emission efficiency. Therefore, the THz radiation from topological insulators can be used to ascertain the existence and characteristics of the Dirac-cone surface states.

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