THz probing of local electron states
in doped lead telluride-based semiconductors

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We review the main results related to unusual local electron states observed in doped lead telluride-based semiconductors.

It is demonstrated that in contrary to traditional impurity states possessing some definite position in the energy spectrum, the observed local electron states are linked to the quasi-Fermi level position and may shift together with this level. Dependence of the density of these states as a function of the alloy composition, magnetic field and electric current is considered. It is shown that these local electron states are responsible for appearance of the persistent photoconductivity in the terahertz spectral region.

Possibilities for application of these materials as high-performance sensors of terahertz radiation are demonstrated.