*Topic: Condensed Matter and Statistical Theory of Many-body Systems/*

**Detection and identification of impurity components by THz scattering**

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 The results of experimental studies on THz radiation scattering on granular composites [1-4] have been theoretically interpreted in terms of a combined scenario of ballistic propagation and photon scattering. In this way, it turns out that at low concentrations of the impurity component that perturbs the basic matrix, the refractive index depends linearly on the concentration. This mode is proposed to be interpreted as the one in which most photons move ballistically (without scattering) in the matrix material. Further, with increasing concentration of impurity particles, we believe that multiple scattering effects begin to play a more significant role. With further increase of the impurity concentration and approaching the most densely packed states, the scattering intensity decreases. This effect can be interpreted as a return to the ballistic scenario in the dynamics of photons in the impurity material. It is proposed to consider the nonmonotonic nonlinear behavior of the scattering intensity in the vicinity of concentration values corresponding to the change of the above ballistic modes as a criterion (marker) that reveals the presence and some parameters of the impurity component and allows its identification. The latter constitutes an effective tool for using THz spectroscopy in applied problems [5-7].

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