Contribution ID: **43** Type: **Oral talk**

Detection and identification of impurity components by THz scattering

Wednesday, 11 June 2025 12:20 (20 minutes)

The results of THz radiation scattering experiments on granular composites are interpreted through a combined scenario of ballistic photon propagation and scattering. At low impurity concentrations, the refractive index varies linearly with concentration, indicating predominantly ballistic transport. As the impurity content increases, multiple scattering becomes more significant. However, near dense packing, scattering intensity decreases, suggesting a return to ballistic behavior within the impurity phase. The observed nonmonotonic scattering behavior serves as a marker for identifying impurity presence and properties, making THz spectroscopy an effective tool for applied diagnostics.

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Session Classification: Condensed Matter and Statistical Theory of Many-body Systems

Track Classification: Condensed Matter and Statistical Theory of Many-body Systems