

Ballistic Charge Carrier Devices for Terahertz Signal Generation.

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It is of great interest, to produce light-weight Terahertz sources for the many applications such as security testing. By reducing the transit distance suitably, the charge carrier can be approximately ballistic, that is without any collision damping. Such structures have been fabricated by epitaxial technology. Another feature can be employed there, namely the loss-free reflection of carriers at a heterojunction barrier. Therefore the charge carriers can be made to resonate between two such barriers at a Terahertz frequency.

Optimum conditions for this to occur are to be presented. Some time back, one of the doctoral candidates of the speaker manufactured and measured the first experimental structure, thus verifying the initial theoretical results of Monte Carlo simulation by this author and his partner. This presentation describes a more detailed understanding of the charge bunching effects. An outlook is presented of further possible concepts such as structures made with graphene.