

## Channeling 2018



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# Surface Plasmon Slowing Down and Cherenkov-Type THz Emission in Graphene Based Structure

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We demonstrate that surface plasmon-polariton waves with low phase velocity in carbon nanostructures can be utilized for the generation of coherent terahertz radiation through the Cherenkov mechanism, the effect being expected to be observable in carbon nanotubes and being especially pronounced in spatially expanded double- and multi-layer graphene structures owing to the suppression of the inter-layer tunneling. Generation frequency tuning is proposed by varying the graphene doping, the number of graphene sheets, the distance between sheets, etc. Significant slowing down of plasmon-polariton in carbon nanotubes and multi-layered graphene structures allows proposing them for nano-scale realization of traveling wave tube.

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