

# Radiative tolerance of graphene: THz components for space applications

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The possibility to utilize graphene as a basic absorptive element in passive Terahertz devices (shields, filters, polarizers, collimators, bolometric-type detectors) for space applications has been investigated by 80 ns 300 keV ions beam comprising 30% of hydrogen and 70% of carbon ions at density of  $1.5 \cdot 10^{12}$  ions per  $\text{cm}^2$ . In order to estimate the ionizing losses and other processes leading to the radiative modification of the graphene based devices the modelling of the ion scattering using SRIM-2013 package (<http://www.srim.org/>) has been performed. Along with THz as well as Raman characterizations, the modeling proves the outstanding radiative resistance of graphene. However, graphene/polymer/SiO<sub>2</sub> heterostructures shows a relatively low tolerance against ionizing radiation due to (i) destructive contribution of low-energy recoil atoms coming back to graphene from the side of dielectric supports and (ii) gas bubbles formation on the graphene/substrate interface leading to snapping off upper graphene layers.

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