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Intense, Narrow-band THz Emission from a Current Source Immersed in Cut-off of Plasma-like Media MIN SUP HUR, Ulsan Natl Inst of Sci Tech (UNIST) , BERNHARD ERSFELD, ADAM NOBLE, Scottish Universities Physics Alliance and University of Strathclyde, HYYONG SUK, GIST, DINO JAROSZYNSKI, Scottish Universities Physics Alliance and University of Strathclyde — Recently we found an interesting behavior of the electromagnetic radiation emerging from cut-off condition of a plasma-like medium, when it is driven by a current source. Differently from conventional total reflection of the incident wave at the cut-off, we found a spatially diffusing and temporally growing electromagnetic field from the current source. Direct result of such diffusion-growth is the selectively enhanced emission (SEE) at the cut-off frequency from a generally broadband current oscillation. We demonstrate examples demonstrating the SEE. One is the two-color-driven THz emission from field ionization of the gas slab located in a tapered waveguide. The emission propagating through the waveguide exhibits a significantly enhanced spectral density at the cut-off frequency. The other example is the THz emission from a magnetized plasma driven by two colliding ultra-short laser pulses. Since a very narrow-band emission can be selectively enhanced from a broadband radiation source, the SEE concept can be used for conversion of a general broadband THz source to a narrow-band one by locating it in a meta-structure such as the waveguide or a plasma-like medium. We discuss other possible systems to which SEE can be applied.

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