GUEST EDITORIAL

Pushing the Limits of Electron and Photon Interactions With Matter

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IN ALL ASPECTS OF OUR modern life, from computing to communication and lighting to photovoltaics, we utilize the atomic engineering of man-made nanostructures. With Moore's law of integrated-circuit scaling failing, new computational architectures and electron devices are emerging.

In this issue, "Phonon Dissipation in Nanostructured Semiconductor Devices," by M. Mohamed, K. Raleva, U. Ravaioli, D. Vasileska, and Z. Aksamija, reports on the significance of advanced simulation tools as we face scaling challenges in electronics. The authors stress the importance of highly localized heat dissipation issues, as the technology shifts from planar metal-oxide-semiconductor field-effect-transistors (FETs) to nanowire-based gate-all-around junctionless FETs. In the second article, "Toward 3D Integrated Photonics Including Lithium Niobate Thin Films," by M. Rüsing, P. O. Weigel, J. Zhao, and S. Mookherjea, the authors propose reducing the footprint and energy consumption of future 3D integrated microsystems through the use of thin-film lithium niobate technology in hybrid waveguide silicon photonics designs.

In "Strong Interference in Planar, Multilayer Perfect Absorbers," A. Ghobadi, H. Hajian, B. Butun, and E. Ozbay review efforts in enabling planar multilayer perfect absorbers with optically thick but electrically thin footprints for photovoltaics and photodetection, photoelectrochemical water splitting, and sensing. As electronics scale down through lithographic extremes and materials that are integrated with atomic precision, this issue highlights the changing fronts of electron and photon interactions with matter.

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