

# SILICON TO GRAPHENE TO SILICINE: PERFORMANCE EVALUATION USING NEADF

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**N**on-Equilibrium Arora's Distribution Function (NEADF) is a new paradigm in performance evaluation of materials. Silicon is the king of electronics where NEADF has been applied successfully in assessment of CMOS and device nanostructures. With the award of 2010 Nobel Prize to Graphene as a perfect two-dimensional nanomaterial, the attention has shifted to layered semiconductors, including silicine and phosphorene. Bandgap engineering of layered semiconductors to nanowires, nanotubes, and nanoribbons has given new paradigms and new opportunities that will be discussed and new applications explored. It is shown that Ohm's law that is used in characterization breaks down on scaled down dimensions giving rise to velocity and current saturation as electric field exceeds its critical value. Ballistic and quantum transport arising from these scaled-down channels will be brought to light.

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