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Nano Peltier cooling device from geometric effects using a single graphene nanoribbon WAN-JU LI, Purdue University, DAO-XIN YAO, Sun Yat-sen University, ERICA CARLSON, Purdue University — Based on the phenomenon of curvature-induced doping in graphene we propose a class of Peltier cooling devices, produced by geometrical effects, without gating. We show how a graphene nanoribbon laid on an array of curved nano cylinders can be used to create a targeted cooling device. Using theoretical calculations and experimental inputs, we predict that the cooling power of such a device can approach $1kW/cm^2$, on par with the best known techniques using standard lithography methods. The structure proposed here helps pave the way toward designing graphene electronics which use geometry rather than gating to control devices.

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