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Atomically Thin Films of Bismuth Telluride: "Graphene-Like" Exfoliation and Thermoelectric Applications[1] DESALEGNE TEWELDEBRHAN, VIVEK GOYAL, ALEXANDER BALANDIN, University of California - Riverside — It follows from theoretical predictions that a drastic improvement in ZT can be achieved in low-dimensional structures where electrons and phonons are strongly confined in one or two dimensions. The latter would require carrier confinement in a quantum well with a width on the order of ∼1 nm and very high potential barriers. Conventional materials growth techniques are not capable of producing such crystalline structures. In this talk, we show that separate Bi-Te atomic layers can be mechanically exfoliated from bulk bismuth telluride crystal following a procedure similar to the exfoliation of graphene. The presence of the van der Waals bonds between five-fold layers allowed us to disassemble bismuth telluride crystals into films with the thickness of five atomic layers and less [1]. The resulting quasi-2-D crystals retain their good electrical conduction and poor thermal conduction properties important for thermoelectric applications. [1] Supplemental Info at: http://ndl.ee.ucr.edu

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