

Abstract Submitted  
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**Zero-dimensional nanostructured material with metallic bismuth nanoparticles: a new route for thermoelectrics** ROLAND BENOIT, MONA TREGUER, CNRS, MARIE-LOUISE SABOUNGI — The thermoelectric figure of merit  $ZT$  has so far not exceeded the value  $ZT=3$  need to compete with mechanical energy conversion systems. However, theoretical work has shown that it is possible to reach values of  $ZT$  higher than this. One of the most promising routes is nanostructured materials, which offer the opportunity to tailor physical properties such as electrical and heat transport, due to the effects of electron filtering and phonon confinement. Dresselhaus *et al.* (*ref.?*) were among the first to show that 2D and 1D structures are capable of reaching  $ZT$  values higher than 2. The thermoelectric materials of current interest are in the form of nanotubes, nanodots and, more generally, superlattices composed of a matrix and nanoparticles. In our work we synthesize a periodic network of bismuth nanoparticles in a matrix of mesoporous  $\text{SiO}_2$ . We find that in this form bismuth transforms from a rhombohedral to a cubic structure, with improved filtering of electrons and phonons.

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