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Thermal properties measurements of silicon nanowires at low temperature HERON JEAN-SAVIN, FOURNIER THIERRY, BOURGEOIS OLIVIER, Neel Institut, CNRS, Grenoble, France — Phonons transport in nanowires and nanotubes is an effervescent field for theoretician as well as experimentalist. Especially at low temperature, where the dimensions of the sample approximate the dominant phonon wave length, the low dimensionality of these systems has strong impact on the thermal transport. Specific regimes have to be considered: transmission coefficient to the heat bath, quantum regime, transition between diffusive and specular regime etc... Firstly, we have performed measurements with the 3ω method on various suspended silicon nanowires with a section of the order of 100nm^2 and a length of 10μm. Above 2 K, the thermal conductance varies like T^3(Casimir Regime); however at lower temperature, a quadratic regime in temperature appears: the signature of a change in the phonon transport regime. Secondly, we have measured nanowires with various geometries, to deduce the impact of geometrical factors at the mesoscopic scale on the thermal transport. All these results will be discussed in view of the different models describing the heat transfer at the nanoscale.

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