## Modeling the Seebeck coefficient of GaAs in the limit of ballistic quantum transport

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Several methods have been developed to determine the Seebeck coefficient for thermoelectric materials. In this work we investigate the Seebeck coefficient for n-GaAs within the limit of ballistic quantum transport. The ballistic quantum transport is calculated by the contact block reduction (CBR) method which is a very efficient variant of the nonequilibrium Green's function formalism. A great advantage of the CBR method is, that we can calculate the Seebeck coefficient of inhomogeneous materials and structures including heterostructures, functionally graded thermoelectric materials and segmented materials self-consistently. The calculations were carried out for a bulk device geometry both for constant doping as well as graded doping with a linear carrier concentration gradient. The left side was taken as the cold and the right side as the hot side. The current is determined by calculating the two different electron distribution functions at the cold and hot contact.

### Speaker Biography

Karl-Heinz Gresslehner have completed his PhD in the field of semiconductor physics in 1981 at the Johannes Kepler University, Linz. He was working more than 10 years in the industry and 24 years as a teacher at a school for higher technical education. Since 2016 he is a professor at the University of Applied Sciences in Upper Austria and is the head of the research group "Thermoelectricity".

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