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Electron-Phonon Coupling from Exact Factorization

CÉSAR R. PROETTO^a, ALI ABEDI^b, IVANO TAVERNELLI^c, E. K. U. GROSS^d

^a *Centro Atómico Bariloche and Instituto Balseiro, 8400 S. C. de Bariloche, Río Negro, Argentina.*

^b *Max-Planck Institut of Microstructure Physics, Weinberg 2, 06120 Halle, Germany.*

^c *IBM Research GmbH, Zurich Research Laboratory, 8803 Ruschlikon, Switzerland.*

^d *Fritz Haber Center for Molecular Dynamics, Institute of Chemistry, The Hebrew University of Jerusalem, 91904 Jerusalem, Israel.*

email:

The electron-phonon coupling (EPC) is one of the cornerstones concepts in condensed matter physics. Its first-principles derivation is on the other side a long-standing open issue. Aimed at filling this gap, a rigorous approach to the EPC has been attempted, starting from the exact factorization (EF) theorem. Two main questions to be discussed in the talk are as follows: i) how to extract the EPC from the time-independent EF electronic and nuclear equations; and ii) how to proceed with the practical evaluation of the EPC within an ab-initio framework?