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The role of non-linear second-order coupling Hamiltonians in photoemission and Raman spectroscopy — JOHANNES FLICK¹, HEIKO APPEL¹, and ●ANGEL RUBIO^{1,2} — ¹Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin, Germany — ²NanoBio Spectroscopy group and ETSEF, Universidad del País Vasco, San Sebastián, Spain

In this talk we employ an exact Fock space representation to study Holstein-Su-Schrieffer-Hamiltonian systems[1,2] coupled to quantized photon modes. In particular, we include non-linear electron-phonon couplings, which originate from an expansion to second order in the nuclear displacement[3]. We perform exact diagonalizations and real-time propagations for the model in Fock space and investigate the effect of the nonlinear couplings on photoemission (PE), inverse photoemission (IPE) and Raman spectra.

[1] W.P. Su, J.R. Schrieffer, A.J. Heeger Phys. Rev. Lett., **42** (1979), pp. 1698–1701

[2] T. Holstein, Ann. Phys. (N.Y.) **8**, 325 (1959)

[3] L. Cederbaum and W. Domcke, J. Chem. Phys. **60**, 7 (1974).
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