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Dielectric breakdown of Mott insulators and the many-body Schwinger mechanism studied with the generalized Bethe ansatz TAKASHI OKA, HIDEO AOKI, University of Tokyo — The dielectric breakdown may be regarded as a condensed matter realization of the Schwinger mechanism - creation of electron-positron pairs by electric fields - in which the threshold for breakdown is considerably reduced due to a quantum leakage of the wave function. In Mott insulators, a many-body counterpart of this phenomena is shown to take place, which is here studied with the quantum tunneling formalism due to Dykhne-Davis-Pechukas as applied to the one-dimensional Hubbard model. We implement this for the quantum tunneling rate with an analytic continuation of the Bethe-ansatz solution for excited states to a non-Hermitian case. This enables us to extend the many- body Landau-Zener picture to the thermodynamic limit, with a remarkable agreement with the time-dependent density matrix renormalization group result. (arXiv:0903.2707)

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