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Core-hole propagator and resonant inelastic X-ray scattering: exact results within a Baym-Kadanoff-Keldysh approach ANDRIJ SHVAIKA, TARAS MYSAKOVYCH, Institute for Condensed Matter Physics, 79011 Lviv, Ukraine, JAMES FREERICKS, Department of Physics, Georgetown University, Washington, DC 20057 — We solve for the core-hole propagator and the resonant inelastic X-ray scattering (RIXS) response functions in correlated materials by employing dynamical mean-field theory. We focus our attention on the spinless Falicov-Kimball model, where the problem can be solved exactly, and the system can be tuned to go through a Mott-Hubbard-like metal-insulator transition (the coupling with the core hole is also a Falicov-Kimball type of interaction). The core-hole propagator is expressed in terms of a continuous fermionic Toeplitz determinant defined only on the upper real-time branch of the Keldysh contour. We have derived exact large-time asymptotics for the core-hole propagator using the Wiener-Hopf finite sum equation technique which produces an efficient algorithm to obtain the density of states of the X-ray edge problem for any temperature and any interaction strength. We have also derived the two-particle vertices in a diagrammatic representation of the scattering processes (using a Baym-Kadanoff-Keldysh approach). As an example of this formalism, we show results for the L-edge contributions to RIXS. *This work was supported by Award No. UKP2-2697-LV-06 of the U.S. Civilian Research and Development Foundation.*

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