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Diluted magnetic semiconductor quantum wells: disorder and electron-electron interaction[1] FEDIR KYRYCHENKO, CARSTEN A. ULLRICH, University of Missouri - Columbia — Using an equation of motion approach for the current-current response function, we develop a theory of electron transport in diluted magnetic semiconductor (DMS) quantum wells that treats disorder and electron-electron interaction on the same footing. A first principle treatment of disorder is implemented which goes beyond the simple relaxation time approximation. Interactions within the electron liquid including correlation effects and collective excitations are accounted for through the methods of time-dependent density functional theory. We present results for transport and optical properties as well as charge and spin collective modes in DMS quantum wells and discuss the influence of charge and spin disorder and electronic many-body effects.

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Fedir Kyrychenko
University of Missouri - Columbia

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