and spectral properties of the Hamiltonian. We apply our results to an Anderson localized polaron, which is the motivation of our study. Joint w/ Rodrigo Matos and Jeffrey Schenker.

- **Maria Perel** Non-adiabatic transitions for the Schroedinger type equation: avoided and unavoidable crossing, Abstract: The adiabatic approximation for monochromatic modes in slowly irregular waveguides may fail near the sections where modes degenerate or almost degenerate, i.e., where phase velocities of two modes coincide or are close to each other. We find that the transformation of modes near such sections can be studied in a general form for waveguides of different nature - acoustic, elastic or electromagnetic - by means of the techniques elaborated in Quantum Mechanics for the Schroedinger equation. The crucial step in the solution of the problem is the reduction of equationsof motion to a Schroedinger type equation. It turns out that the Hamiltonianin this equation is non self-adjoint even for waveguides without dissipation.We study the transformation of modes of the Schroedinger type equation with a non self-adjoint Hamiltonian ofspecial form. We assume that the Hamiltonian is a small perturbation of one with a crossing point of eigenvaluesas functions of time and the parameter characterizing an order of the perturbation is a square root of the adiabatic parameter. The non perturbed Hamiltonian is assumed to be dialonalizable. After the perturbation, two regimes of eigenvalue behavior are possible: avoided crossingand two close points of degeneration. We have obtained asymptotic solutions and transfer matrices in both cases. The Landau-Zener formulas are obtained in the case of avoided crossing of eigenvalues.The transfer matrix for the case of unavoidable crossing is different. Two distinct physical processes correspond to both cases.

- **Nishant Rangamani,** Spectral and Dynamical Localization for Random Polymer Models,