1135-35-66 **Viktoria Savatorova*** (viktoria.savatorova@unlv.edu) and **Aleksei Talonov**.

Multi-scale modeling of high frequency wave propagation in heterogeneous medium with cracks.

In this work we perform multi-scale modeling of small amplitude wave propagation in pre-loaded heterogeneous media with cracks. We suppose the existence of several length scales: the smallest microscale defining the characteristic size of cracks, the mesoscale defining the characteristic size of periodic distribution of heterogeneities, and the macroscale which can be defined as a global characteristic size. We assume cracks to be isolated, randomly oriented, with periodic distribution of concentration of cracks. We start with studying open cracks, and then consider closed cracks taking into account the Coulomb friction between crack faces. When the wavelength of a travelling signal becomes comparable with the mesoscale's characteristic size, successive reflections and refractions of the waves lead to the formation of a complicated sequence of the pass and stop frequency bands. We present an asymptotic procedure based upon a two-scale approach to derive wave dispersion, identify pass and stop frequencies, and study how displacements and wave velocities depend on averaged concentration and distribution of cracks, direction of wave propagation, and an external load. (Received July 17, 2017)