



Ab-initio calculations of equipartition in global seismology

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Observations of the long-period ($T > 60$ s) seismic coda of large ($M > 8$) earthquakes show a stabilization of the vertical to horizontal kinetic energy ratio, which is not predicted by 1-D reference earth models. This discrepancy implies a significant amount of coupling between the normal modes of the Earth. We hypothesize that the observed stabilization is caused by an equipartition of the seismic energy. In order to test this assumption, we explore numerically how strong scattering by randomly distributed heterogeneities affects the distribution of energy among the different components of the signal. In most cases, we indeed find a stabilization of various energy ratios at large lapse times. For sufficiently smooth background models, the energy ratios are in very good agreement with simple independent theoretical predictions. In the presence of discontinuities or anelasticity, the theory breaks down, but the full numerical approach still provides an estimate of the asymptotic energy ratios.