1114-49-325 **Ke Yin*** (kyin@math.ucla.edu), 520 Portola Plaza, 6363 Math Science Building, Los Angeles, CA 90095, and **Omer Faruk Tekin** and **Farzin Barekat**. *Spectral results for perturbed variational eigenvalue problems and their applications to Compressed PDEs.*

We consider the solutions to a modification of the Courant's minimax characterization of the Dirichlet eigenfunctions of second order linear symmetric elliptic operators in a bounded domain Ω in $\mathbb{R}^d$. In particular, we perturb the objective functional by an arbitrary bounded penalty term. Without perturbation, it is well-known that Courant minimax principle yields the eigenfunctions, which form an orthonormal basis for $L^2(\Omega)$. We prove that the solutions of the perturbed problem still form an orthonormal basis in the case of $d = 1$, and $d = 2$, provided that the perturbation is sufficiently small in the latter case. As an application, we prove completeness results for compressed plane waves and compressed modes, which are the solutions to analogous variational problems with perturbations being an L^1-regularization term. The completeness theory for these functions sets a foundation for finding a computationally efficient basis for the representation of the solution of differential equations. (Received August 31, 2015)