1079-05-297 **Linyuan Lu** (lu@math.sc.edu), Columbia, SC 29208, and **Xing Peng*** (pengx@mailbox.sc.edu), Columbia, SC 29208. *Loose Laplacian spectra of random hypergraphs.*

Let $H = (V, E)$ be an r-uniform hypergraph with the vertex set V and the edge set E. For $1 \leq s \leq r/2$, we define a weighted graph $G^{(s)}$ on the vertex set $\binom{V}{s}$ as follows. Every pair of s-sets I and J is associated with a weight $w(I, J)$, which is the number of edges in H containing I and J if $I \cap J = \emptyset$, and 0 if $I \cap J \neq \emptyset$. The s-th Laplacian $\mathcal{L}^{(s)}$ of H is defined to be the normalized Laplacian of $G^{(s)}$. For $0 < p < 1$, let $H^r(n, p)$ be a random r-uniform hypergraph over $[n] := \{1, 2, \ldots, n\}$, where each r-set of $[n]$ has probability p to be an edge independently. We prove the eigenvalues of $\mathcal{L}^{(s)}(H^r(n, p))$ can be approximated by those of the expectation hypergraph. Moreover, we show the distribution of eigenvalues of $\mathcal{L}^{(s)}(H^r(n, p))$ follows the Semicircle Law. (Received January 17, 2012)