1112-13-269 **Bjørn Ian Dundas**, **Ayelet Lindenstrauss*** (alindens@indiana.edu) and **Birgit Richter**.
Calculations of Higher Topological Hochschild Homology.

For R a commutative ring, M an R-module, and $X.$ a pointed simplicial set, J.-L. Loday defined a simplicial R-module $\mathcal{L}_{X.}(R;M)$ which in each simplicial degree n consists of a tensor product, indexed by all the n-simplices in X_n, of copies of R, except that over the base point one has a copy of M. The homology groups of $\mathcal{L}_{X.}(R;M)$ with respect to $d=\sum_{i=0}^{n}(-1)^i d_i$ are homotopy invariants of $|X.|$. Taking $X.$ to be the minimal model of S^1, one recovers the standard Hochschild complex for R with coefficients in M. Using $X.=S^n$ instead, one gets higher Hochschild homology groups. One can do the same thing when $\mathbf{R}$ is a commutative ring spectrum and $\mathbf{M}$ an $\mathbf{R}$-module to get the higher topological Hochschild homology groups. If $\mathbf{R}$ and $\mathbf{M}$ are Eilenberg-Mac Lane spectra, taking the sphere spectrum as the ground ring spectrum gives a finer invariant than using an Eilenberg-Mac Lane spectrum, which recovers the algebraic case. I will discuss basic higher Hochschild homology calculations, our calculation of $\mathrm{T}HH^{[n]}(\mathbb{Z};\mathbb{F}_p)$, as well as a calculation of $\mathrm{T}HH^{[n]}(\mathbb{F}_p)$. (Received August 06, 2015)