Topology Seminar

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of Johns Hopkins University will be speaking on

Real Johnson-Wilson theories and Landweber flat exact pairs

on September 18 at 4:30 in
MIT Room 2-131

Real Johnson-Wilson theories, $ER(n)$ are a family of cohomology theories generalizing (2-local) real K-theory, KO, which is $ER(1)$. They were first studied by Hu-Kriz and later by Kitchloo-Wilson. Real Johnson-Wilson theories are defined as fixed points of an involution acting on the complex-oriented Johnson-Wilson theories $E(n)$, but they are themselves not complex oriented.

Real Johnson-Wilson theories have proven to be remarkably useful, as well as computationally amenable. For example, their properties were exploited to demonstrate some new nonimmersions of real projective spaces into euclidean space. The main tool for computing real Johnson-Wilson cohomology is a (Bockstein-type) spectral sequence that begins with $E(n)$-cohomology and converges to $ER(n)$-cohomology. We take advantage of the internal algebraic structure of this spectral sequence converging to $ER(n)^*(\mathrm{pt})$, to prove that for certain spaces Z with Landweber-flat $E(n)$-cohomology, the cohomology ring $ER(n)^*(Z)$ can be obtained from $E(n)^*(Z)$ by a somewhat subtle base change. In particular, our results allow us to compute the Real Johnson-Wilson cohomology of the Eilenberg-MacLane spaces $Z = K(\mathbb{Z}, 2m+1), K(\mathbb{Z}/2, m), K(\mathbb{Z}/2^q, 2m)$ for any integers m and q, as well as connective covers of BO: BO, BSO, $BSpin$ and $BO\langle 8\rangle$.

This is joint work with Stephen W. Wilson and Vitaly Lorman.