Seminar: K-theory and generalizations

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Tu 12:40-2:00, Evans 939

The aim of the seminar is to understand at a basic level elliptic cohomology as a genuine equivariant theory, building up from K-theory. We will focus on the heuristics and geometry rather than chromatic homotopy calculus.
References will be updated as we go along and we find more accessible and pertinent sources.

Date	Speaker	Topic	References
9/15	Teleman	Introduction and planning	
9/22		K-theory, operations, Chern character, topological index theorem	[A1]
9/29	Sam	Equivariant K-theory and applications. Weyl character formula, vanishing of $\hat{A}$-genus. Completion theorem.	[S, AS]
10/6	Ruslans	U(1)-gerbes and twisted K-theory	[FHT1, **?**]
10/13	Songyu	Twisted equivariant K-theory, loop group representations. Chern character	[FHTc, FHT1]
10/20	Kabir	Interlude: cohomology theory from formal groups: the Quillen construction	[P, R]
10/27	Swapnil	Landweber's exact functor theorem and elliptic cohomology away from $p = 2, 3$	[DFHH]
11/3	Zechen or Elliot	Path integral construction of the index	[A2, T]
11/10	Zechen or Elliot	Elliptic genera by path integration	[W1, W2]
11/17		Equivariant elliptic cohomology, first contact	[K, Lu]
11/24		Elliptic cohomology, K-theory and loop group representations	[K, Lu, W1]
12/1		Status report of equivariant elliptic cohomology	
12/8		Overflow lecture	

References

[A1] M.F. Atiyah, K-theory, AMS Chelsea

[A2] M.F. Atiyah: Circular symmetry and stationary phase approximation.

[AS] Atiyah, Segal: equivariant K-theory and completion. JDG 1969

[BC...] Bouwknegt et al.: Twisted K-theory and bundle gerbes

[DFHH] C. Douglas et al: Topological Modular Forms

[FHT1] Freed, Hopkins, Teleman: Loop groups and twisted K-theory, I

[FHTc] Freed, Hopkins, Teleman: Twisted equivariant K-theory with complex coefficients

[K] N. Kitchloo: Quantization of the Modular functor and equivariant elliptic cohomology

[L] P. Landweber: Elliptic Genera. Elliptic cohomology and modular forms. In Elliptic curves and modular forms in algebraic topology

[Lu] K. Luecke: Completed K-theory and equivariant elliptic cohomology

[P] E. Peterson, Formal Geometry and Bordism operations, Cambridge

[R] Ravenel, Complex cobordism and Stable Homotopy, AMS Chelsea, esp. Appendix A2

[S] G. Segal: Equivariant K-theory

[T] C. Teleman, Senior thesis

[W1] E. Witten: Index of the Dirac operator in Loop space. In: Elliptic curves and modular forms in algebraic topology

[W2] E. Witten: Index of Dirac operators. In: Quantum fields and Strings, a course for Mathematicians, AMS 1999