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Hopkins, Michael J. (1-CHI)
Characters and elliptic cohomology.
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This well-written article is a useful survey of recent work on $E^*(BG)$, where G is a finite group and $E^*(\ )$ is a complex oriented cohomology theory of a certain type discussed in the paper, namely those constructed from complex cobordism $M\mathrm{U}^*(\ )$ using a genus $\varphi\colon M\mathrm{U}_* \longrightarrow \mathbf{R}_*$ to form the functor $E^*(\ ) = \mathbf{R}_* \otimes_{M\mathrm{U}_*} M\mathrm{U}^*(\ )$ which is itself a cohomology theory under appropriate hypotheses on φ. Amongst the theories so obtained are ordinary cohomology $H^*(\ ;A)$ with A a $\mathbf{Q}$-algebra, complex K-theory $K\mathrm{U}^*(\ )$, the p-local theories $E(n)^*(\ )$ of Johnson and Wilson, as well as the more recent elliptic cohomology $\mathrm{Ell}^*(\ )$ of Landweber, Ravenel and Stong.

The above construction of such theories uses formal group theory and the work on $E^*(BG)$ described in this article also draws heavily on ideas from Lubin-Tate theory and has connections with class field theory. Of course, for the cases of ordinary cohomology with real coefficients and complex K-theory, there are more geometric constructions available, and ideas of E. Witten suggest that this is true of elliptic cohomology too. However, in general, it seems that the algebra and number theory associated to formal groups will continue to exert a strong influence on the development of this part of topology.

{For the entire collection see MR1055861 (90m:55001)}

Reviewed by *Andrew J. Baker*