Homological stability for asymptotic monopole moduli spaces

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Abstract.

Magnetic monopoles were introduced by Dirac in 1931 to explain the quantisation of electric charges. In his model, they are singular solutions to an extension of Maxwell's equations allowing non-zero magnetic charges. An alternative model, developed by 't Hooft and Polyakov in the 1970s, is given (in the BPS limit) by smooth solutions to a different set of equations, the *Bogomolny equations*. The moduli space of all solutions has connected components M_k indexed by positive integers k (the "magnetic charge"). These have been intensively studied, notably by Donaldson (an interpretation in terms of rational self-maps of $\mathbb{CP}^1$), Segal (the homotopy type of M_k "stabilises" as k goes to infinity) and Cohen-Cohen-Mann-Milgram (describing the homology of M_k in terms of braid groups). A compactification of M_k has recently been proposed by Fritzsch-Kottke-Singer, whose boundary strata we call *asymptotic monopole moduli spaces*. I will describe ongoing joint work with U. Tillmann in which we study stability patterns in the homology of these spaces.