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Conformal limit of Higgs bundles along singular upward flow

Motivated by supersymmetric gauge theory, Gaiotto introduced the notion 'conformal limit' and conjectured that the conformal limit of a Higgs bundle on the Hitchin section exists and is an oper. This conjecture was confirmed by Dumitrescu-Fredrickson-Kydonakis-Mazzeo-Mulase-Neitzke. Later, it was generalized and proved affirmatively by Collier-Wentworth to upward flow through a stable \mathbb{C}^* -fixed point in the moduli of Higgs bundles.

In this talk, we will review the definitions and these developments, and then explore various instances of extension to cases where the upward flow is singular. The latter part is based on my ongoing work.