Dumitrescu, Olivia; Fredrickson, Laura; Kydonakis, Georgios; Mazzeo, Rafe; Mulase, Motohico; Neitzke, Andrew

From the Hitchin section to opers through nonabelian Hodge. (English) Zbl 1458.53035 J. Differ. Geom. 117, No. 2, 223-253 (2021).

Summary: For a complex simple simply connected Lie group \(G\), and a compact Riemann surface \(C\), we consider two sorts of families of flat \(G\)-connections over \(C\). Each family is determined by a point \(u\) of the base of Hitchin’s integrable system for \((G, C)\). One family \(\nabla_{h, u}\) consists of \(G\)-opers, and depends on \(h \in \mathbb{C}^\times\). The other family \(\nabla_{R, \zeta, u}\) is built from solutions of Hitchin’s equations, and depends on \(\zeta \in \mathbb{C}^\times, R \in \mathbb{R}^+\). We show that in the scaling limit \(R \to 0, \zeta = hR\), we have \(\nabla_{R, \zeta, u} \to \nabla_{h, u}\). This establishes and generalizes a conjecture formulated by Gaiotto.

MSC:
- 53C07 Special connections and metrics on vector bundles (Hermite-Einstein, Yang-Mills)
- 58E15 Variational problems concerning extremal problems in several variables; Yang-Mills functionals
- 14D21 Applications of vector bundles and moduli spaces in mathematical physics (twistor theory, instantons, quantum field theory)
- 81T13 Yang-Mills and other gauge theories in quantum field theory

Keywords:
- Hitchin’s equations
- moduli space of Higgs bundles
- opers
- nonabelian Hodge correspondence

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References:


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