**Witten, Edward**

**Mirror symmetry, Hitchin's equations, and Langlands duality.** (English) Zbl 1298.81151

García-Prada, Oscar (ed.) et al., The many facets of geometry. A tribute to Nigel Hitchin. Oxford: Oxford University Press (ISBN 978-0-19-953492-0/hbk). 113-128 (2010).

The author and *A. Kapustin* [Commun. Number Theory Phys. 1, No. 1, 1–236 (2007; Zbl 1128.22013)] have established a grand description of the geometric Langlands program for complex Riemann surfaces, as is usual with Witten, within the framework of quantum field theory. The crucial step was based upon the reduction of Wilson and t'Hooft line operators to topological operators acting naturally on the branes of the two-dimensional sigma-model. The idea was generalized [in: Current developments in mathematics, 2006. Jerison, David (ed.) et al., Somerville, MA: International Press. 35–180 (2008; Zbl 1237.14024)] by the author and *S. Gukov* to tame ramification, while its generalization to wild ramification was discussed in [Anal. Appl., Singap. 6, No. 4, 429–501 (2008; Zbl 1177.81101)] by the author. This paper is a good introduction to these developments.

For the entire collection see [Zbl 1192.00076].

Reviewer: Hirokazu Nishimura (Tsukuba)

**MSC:**

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|---|---|
| 81T10 | Model quantum field theories |
| 81T30 | String and superstring theories; other extended objects (e.g., branes) in quantum field theory |
| 14D21 | Applications of vector bundles and moduli spaces in mathematical physics (twistor theory, instantons, quantum field theory) |
| 20F36 | Braid groups; Artin groups |



**Keywords:**

geometric Langlands program; quantum field theory; Hitchin equation; tame ramification; wild ramification; sigma model; Higgs bundle; electric-magnetic S-duality; affine braid group; hyper-Kähler moduli space

**Full Text:** arXiv