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**Yisong Yang\*** (yisong.yang@yu.edu), New York, NY 10033. *Existence and Nonexistence of Electricity in Two-Dimensional Static Gauge Field Theories*. Preliminary report.

It is a well accepted principle that finite-energy static solutions in the classical relativistic gauge field theory over the  $(2 + 1)$ -dimensional Minkowski spacetime must be electrically neutral. Such a statement is referred to as the Julia–Zee theorem by field theorists. Here we present a mathematical proof of this fundamental structural property. As applications, we see that the static Abelian Higgs theory is necessarily the Ginzburg–Landau theory which is purely magnetic, and that, the presence of a Chern–Simons term is essential to allow the existence of a solution carrying both electric and magnetic charges, known as dyons. (Joint work with Joel Spruck) (Received February 22, 2009)