

October 23, 2013, 4:30 in 10-250: Edward Frenkel (UC Berkeley), *The Langlands Program and Quantum Physics*.

A geometric version of the Langlands Program has been linked, in the works of Witten and others, to the electromagnetic duality of four-dimensional quantum gauge theories. But where does that duality come from? It turns out that it has a natural geometric explanation from the point of view of a mysterious six-dimensional quantum field theory, whose existence is predicted in string theory and M-theory and which appears to have no Lagrangian description. Although they are still conjectural, various properties of this theory have been recently used to reveal surprising connections between 4D and 2D quantum field theories, some of which have now been rigorously proved. I will review some of these connections and their implications for the geometric Langlands Program.