1014-57-511 **Soren K Hansen*** (hansen@math.ksu.edu), Department of Mathematics, Kansas State University, 138 Cardwell Hall, Manhattan, KS 66506. *Asymptotics of the quantum SU(2)-invariants for surgeries on the figure 8 knot.*

We will describe joint work with J.E.Andersen on the quantum SU(2)-invariants of the 3-manifolds $M_{p/q}$ obtained by surgeries on the 3-sphere along the figure 8 knot with rational surgery coefficients p/q. Our goal is to calculate the asymptotics of these invariants in the limit of large quantum level. First we obtain a complex double contour integral formula for the invariants by using Faddeev's quantum dilogarithm. This formula allows us to propose a formula for the leading large level asymptotics of the invariants. Analyzing this formula by the saddle-point method leads together with a study of the classical SU(2) Chern-Simons theory on $M_{p/q}$ to a formula for the leading asymptotics of the invariants which is in agreement with Witten's conjecture for the semiclassical approximation of the quantum SU(2)-invariants of closed oriented 3-manifolds. Thus we obtain a precise correspondence between certain critical points of certain phase functions and the moduli space of flat SU(2) connections on $M_{p/q}$. Moreover, we show that the critical values of the involved phase functions corresponds to Chern-Simons invariants under this correspondence. Our analysis uses results of R.Riley and P.Kirk and E.Klassen on the involved moduli space and Chern-Simons theory. (Received September 19, 2005)