1127-49-350 **Jochen Denzler*** (denzler@math.utk.edu), Dept of Mathematics, Ayres Hall, 1403 Circle Dr, Knoxville, TN 37996-1320. *The Oval Problem and Its Euler-Lagrange Equation.* Preliminary report.

The problem to minimize the principal eigenvalue of a Schrödinger operator $-d^2/ds^2+\kappa^2$ (with κ the curvature) on a loop of fixed length, as a function of the geometry of the loop, has been known as the Oval Problem. Existence and regularity of a solution (which are nontrivial due to a lack of compactness and coercivity) have been proved in prior work. The Euler-Lagrange equation for the problem seems rather daunting, and a proof for the conjectured family of minimizers has been elusive for over a decade. Nevertheless, the EL equation of the problem displays some intriguing structure that gives rise to insight (including an abundance of non-minimal critical points). I will elaborate on some details of this structure. This is a preliminary report on work in progress. (Received February 07, 2017)