Minimization problems for eigenvalues
of the Laplacian-Dirichlet operator
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We first recall some classical results and open questions about minimization problems concerning the three first eigenvalues of the Laplacian-Dirichlet operator.

Then, we present recent advances on this topic. We will focus, in particular, on two problems:

- minimization of the second eigenvalue amongst plane convex domains. We prove that the minimizer cannot be the "stadium" (convex hull of two tangent disks of same radius), refuting a conjecture due to Troesch. Nevertheless, we prove that the minimizer has two parallel flat parts on its boundary.

- minimization of the third eigenvalue. We prove existence of a minimizer.