Spectral optimization of the periodic principal eigenvalue of a space-time periodic, cooperative, parabolic operator

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In this talk I will report on recent results obtained in collaboration with Idriss Mazari (Univ. Paris-Dauphine) on the topic of optimization of principal eigenvalues for parabolic operators acting on vector-valued functions. I will first recall the interest and relevance of such principal eigenvalues, especially in the space-time periodic framework, and then I will present the optimization problem we focused on, that is the optimization of the principal eigenvalue of a space-time periodic cooperative operator with respect to the off-diagonal elements of the coupling matrix. It turns out that this is not a convex optimization problem and that the construction of optimizers, both minimizers and maximizers, requires a new method. We devise such a method by taking inspiration in a matrix-theory paper of 2007 by Neumann and Sze.