1162-35-203 **Gautam Iyer*** (gautam@math.cmu.edu), Department of Mathematical Sciences, Carnegie Mellon University, PA 15213, and **Son Van**. *Bounds on the heat transfer rate via passive advection.*

In heat exchangers, an incompressible fluid is heated initially and cooled at the boundary. The goal is to transfer the heat to the boundary as efficiently as possible. In this talk we study a related steady version of this problem: Consider the steady state temperature of in a fluid that is stirred, uniformly heated and cooled on the boundary. For a given Péclet number is large, how should one stir to minimize the total heat? This problem was studied by Marcotte, Doering, Thiffeault and Young in '18, where the authors provided many heuristics and numerical simulations. In this talk we will show that when the Péclet number is large, one can always find a stirring velocity field so that the total heat is at most $O((\log \mathrm{Pe})^9/\mathrm{Pe}^{1/2})$. We suspect this is optimal (up to a logarithmic correction), but are presently unable to prove a matching lower bound. (Received August 31, 2020)