Standing acoustic wave manipulation of particles in a fluid
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Standing acoustic wave manipulation of particles in a fluid Under certain conditions, particles within a fluid that are subject to a standing acoustic wave tend to cluster at the nodal sets of the wave. We study the problem of finding a standing acoustic wave whose nodal sets are close to a desired design for the particle locations. We tackle this problem by finding the best approximation of a function by Herglotz wave functions, which are particular solutions to the Helmholtz equation. In doing so, we relate a design problem to classic wave imaging results. This technique could be exploited to fabricate selectively reinforced composite materials, by placing e.g. carbon nanotubes in a polymer matrix that can be cured with light while leaving the inclusions in the desired locations.