

ACTIVE THERMAL EXTRACTION FOR RADIATIVE HEAT TRANSFER

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Radiative heat transport between polar materials supporting surface-phonon polaritons has been shown to be greatly enhanced when two objects are placed at sub-wavelength separation due to the contribution of near-field surface modes. However, the enhancement is limited to extremely small distances due to the evanescent decay of the surface waves. In this work, we investigate how this limitation might be overcome using an active method to extract near-field surface modes to the far-field. By placing a gain medium in the near-field of the object and introducing external off-resonant optical pumping, the resonant surface mode can be emitted into the far-field in an anti-stokes fashion. We analyze the system with realistic parameters to assess the feasibility and efficiency of our approach.