

Abstract Submitted  
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**Van Hove Singularities due to hydrodynamic interactions among the spheres in two dimensional flow system**<sup>1</sup> HYUK KYU PAK, IMRAN SAEED, TSVI TLUSTY, IBS Center for Soft and Living Matter/UNIST — Dispersion relation for the phonon-like collective vibration modes due to the hydrodynamic interactions among the spherical particles with periodic separation  $a$  in quasi two dimensional flow shows peaks at the wavelength of  $4.759a$ . In analogy to Van Hove singularities in solids, the density of states for hydrodynamically interacting systems becomes infinite at this wavelength with vanishing group velocities. Existence of these singularities is verified by computer simulation of hydrodynamic phonons in two cases: for periodic boundary conditions and for the system with broken symmetries. However, in unbounded systems the collective vibration decays before reaching the singularity

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Hyuk Kyu Pak  
IBS Center for Soft and Living Matter/UNIST

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