



سمینار هفتگی ماده چگال نرم

## Journal club: “Taxis of cargo-carrying microswimmers in traveling activity waves”

Link: [https://www.researchgate.net/publication/368652821\\_Taxis\\_of\\_cargo-carrying\\_microswimmers\\_in\\_traveling\\_activity\\_waves](https://www.researchgate.net/publication/368652821_Taxis_of_cargo-carrying_microswimmers_in_traveling_activity_waves)

### Abstract

“Many fascinating properties of biological active matter crucially depend on the capacity of constituting entities to perform directed motion, e.g., molecular motors transporting vesicles inside cells or bacteria searching for food. While much effort has been devoted to mimicking biological functions in synthetic systems, such as transporting a cargo to a targeted zone, theoretical studies have primarily focused on single active particles subject to various spatial and temporal stimuli. Here we study the behavior of a self-propelled particle carrying a passive cargo in a travelling activity wave and show that this active-passive dimer displays a rich, emergent tactic behavior. For cargoes with low mobility, the dimer always drifts in the direction of the wave propagation. For highly-mobile cargoes, instead, the dimer can also drift against the traveling wave. The transition between these two tactic behaviors is controlled by the ratio between the frictions of the cargo and the microswimmer. In slow activity waves the dimer can perform an active surfing of the wave maxima, with an average drift velocity equal to the wave speed. These analytical predictions, which we confirm by numerical simulations, might be useful for the future efficient design of bio-hybrid microswimmers.”

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مکان: اتاق ۵۱۲ دانشکده فیزیک دانشگاه صنعتی شریف - کلاس مجازی دکتر اجتهادی:

<https://vc.sharif.edu/ch/ejtehadi>