

Abstract Submitted
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Optimal target localization in turbulent environment with olfaction and team search LORENZO PIRO, Max Planck Institute for Dynamics and Self-Organization, Goettingen, Germany, MIHIR DURVE, QLS, ICTP, Trieste, Italy, MASSIMO CENCINI, CNR-ISC, Rome and INFN, sez. Roma Tor Vergata, Italy, LUCA BIFERALE, Dept. of Physics and INFN, Roma Tor Vergata, Italy, ANTONIO CELANI, QLS, ICTP, Trieste, Italy — Locating an odor source is a vital nontrivial task for animals. Turbulent air breaks odor patches into sparse bunches making traditional search strategies ineffective. Male moths have developed, at the individual level, ‘smart strategies’ to find their mates using sparse odor and wind detection. Here, we investigate if a group of cooperating agents can boost performance of a search process. In our model of swarm of agents, an agent navigates in a turbulent environment using its own perceived private information such as odor and wind detections and public information about the decisions made by its peers. We show that, there is an optimal way to blend the two for a group to find an odor source by following almost the direct path to the target. Conversely, groups who discard public information or don’t put enough weight on private information are much slower. Our results could prove useful in robotics [Piro et al. PRE 102 (1), 012402 (2020)].

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