

Abstract Submitted
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Mist collection on parallel fiber arrays ROMAIN LABB, CAMILLE DUPRAT, LadHyX, Ecole polytechnique — Fog is an important source of fresh water in specific arid regions such as the Atacama Desert in Chile. The method used to collect water passively from fog, either for domestic consumption or research purposes, consists in erecting large porous fiber nets on which the mist droplets impact. The two main mechanisms involved with this process are the impact of the drops on the fibers and the drainage of the fluid from the net, while the main limiting factor is the clogging of the mesh by accumulated water. We consider a novel collection system, made of an array of parallel fibers, that we study experimentally with a wind mist tunnel. In addition, we develop theoretical models considering the coupling of wind flow, droplet trajectories and wetting of the fibers. We find that the collection efficiency strongly depends on the size and distribution of the drops formed on the fibers, and thus on the fibers diameter, inclination angle and wetting properties. In particular, we show that the collection efficiency is greater when large drops are formed on the fibers. By adjusting the fibers diameter and the inter-fiber spacing, we look for an optimal structure that maximizes the collection surface and the drainage, while avoiding flow deviations.

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