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Walking and jumping spores PHILIPPE MARMOTTANT, University of Grenoble and CNRS, Lab. Interdisciplinaire de Physique, France — The Equisetum plants, more commonly called "horsetail," emit 50-microns spores that are spherical in shape and present four hygroscopic arms. Under high humidity, the arms are retracted. But under lower humidity, less than 70%, the four arms deploy beautifully. With time-lapse image recordings, we show that under repeated cycles of dry and high humidity, the spores behave as random walkers, since they move by about their size in a different direction at every cycle. The process is apparently stochastic because of the complex shape of the arms and hysteretic friction of the arms on the ground. For some spores, a decrease in humidity level results in very fast jumps, the spores taking off at a typical velocity of a meter per second, as recorded on high-speed camera. With these jumps, they reach centimetric elevations, much larger than their size. The physical mechanism at the root of these "Levy-flight" jumps is still under investigation. The walking and jumping phenomena thus provide motility, which we believe is helpful for the understanding of the biological dispersion of the spores. It could also bring biomimetic inspiration to engineer new motile elastic structures.

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