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**Giant number fluctuations in self-propelled particles without alignment**[1] YAOUEN FILY, SILKE HENKES, Syracuse University, M. CRISTINA MARCHETTI, Syracuse University and Syracuse Biomaterials Institute — Giant number fluctuations are a ubiquitous property of active systems. They were predicted using a generic continuum description of active nematics, and have been observed in simulations of Vicsek-type models and in experiments on vibrated granular layers and swimming bacteria. In all of these systems, there is an alignment interaction among the self-propelled units, either imposed as a rule, or arising from hydrodynamic or other medium-mediated couplings. Here we report numerical evidence of giant number fluctuations in a minimal model of self-propelled disks in two dimensions in the absence of any alignment mechanism. The direction of self-propulsion evolves via rotational diffusion and the particles interact solely via a finite range repulsive soft potential. It can be shown that in this system self propulsion is equivalent to a non Markovian noise whose correlation time is controlled by the amplitude of the orientational noise.

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