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Active Brownian Particles with Active Fluctuations PAWEL ROMANCZUK, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, ROBERT GROSSMANN, LUTZ SCHIMANSKY-GEIER, Department of Physics, Humboldt University Berlin, Germany — We study the effect of different types of noise on the dynamics of self-propelled particles with variable speed (active Brownian particles). We distinguish between passive and active fluctuations. Passive fluctuations are considered independent of the direction of particle's motion (e.g., thermal fluctuations). In contrast, active ones are assumed to be intrinsically connected with the propulsion mechanism of the active particle and, as a result, correlated with its time-dependent orientation. We calculate the stationary speed and velocity probability density functions of non-interacting active Brownian particles in the presence of both fluctuation types and discuss the generic signature of active fluctuations [1]. Furthermore, we discuss a model of active Brownian particles interacting via a velocity-alignment force [2]. We show, based on the results of a corresponding mean-field theory, how the type of fluctuations has a strong impact on the onset and stability of collective motion.

[1] P. Romanczuk and L. Schimansky-Geier, *Phys Rev Lett*, **106**, 230601 (2011)
[2] P. Romanczuk and L. Schimansky-Geier, *Ecol Compl*, in press, doi:10.1016/j.ecocom.2011.07.008 (2011)

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