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Correlated Rotational Noise in Active Brownian Systems CALEB WAGNER, APARNA BASKARAN, Brandeis Univ — We consider a system of self-propelled particles in a viscous medium for which the angle parametrizing the direction of particle propulsion is subject to correlated noise. The physics involved in the correlated noise is explored by deriving a modified Smoluchowski equation that governs the evolution of the probability distribution for particle positions and orientations. More precisely, given noise correlations that decay exponentially in time with decay constant ν, we give the modified Smoluchowski equation as a perturbative expansion in ν. While the physical origins of correlated noise may be diverse, we give one interpretation of the resulting dynamics in terms of inertial effects that are absent from the usual overdamped description of self-propelled particles in a viscous medium.

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