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Orientation mixing in active suspensions

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We consider a model introduced by Saintillan and Shelley to describe active suspensions of elongated particles. This model, which generalizes the classical Doi model for passive suspensions, couples a Stokes equation for the fluid substrate and a transport equation for the density distribution of particles in space and orientation. We investigate mixing properties of this model (damping and enhanced dissipation). The main new feature of the analysis is that the usual velocity variable of the euclidean space is replaced by an orientation variable on the sphere, which is responsible for strong qualitative changes and new mathematical difficulties. This is joint work with M. Coti Zelati and H. Dietert.

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