

Global existence and collisions for symmetric configurations of nearly parallel vortex filaments

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We consider the Schrödinger system with Newton-type interactions that was derived by R. Klein, A. Majda and K. Damodaran [18] to modelize the dynamics of N nearly parallel vortex filaments in a 3-dimensional homogeneous incompressible fluid. The known large time existence results are due to C. Kenig, G. Ponce and L. Vega [17] and concern the interaction of two filaments and particular configurations of three filaments. In this article we prove large time existence results for particular configurations of four nearly parallel filaments and for a class of configurations of N nearly parallel filaments for any $N \geq 2$. We also show the existence of travelling wave type dynamics. Finally we describe configurations leading to collision.

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