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Spatiotemporal chaos with shear banding in a driven nematogenic fluid DEBARSHINI CHAKRABORTY, CHANDAN DASGUPTA, SRIRAM RAMASWAMY, AJAY SOOD, Indian Institute of Science — We present the results of a numerical study of a model of the hydrodynamics of a sheared nematogenic fluid in which spatial variations are allowed only in the gradient direction and the effects of order parameter stresses on the velocity profile are taken into account. When the value of a dimensionless viscosity parameter is so chosen that the order parameter stress is comparable to the bare viscous stress, the system exhibits steady states with the characteristics of shear banding, In addition, a non-zero choice of a parameter that governs the effect of the velocity field on stretching the nematic order parameter leads to the appearance of a new steady state in which the features of both spatiotemporal chaos and shear banding are present.

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