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Modification of roton instability due to the presence of a second dipolar Bose-Einstein condensate[1] M. ASAD-UZ-ZAMAN, D. BLUME, Washington State University — We study the behavior of two coupled purely dipolar Bose-Einstein condensates, each located in a cylindrically symmetric pancake-shaped external confining potential, as the separation b between the traps along the tight confining direction is varied. The solutions of the coupled Gross-Pitaevskii and Bogoliubov-de Gennes equations, which account for the full dynamics, show that the system behavior is modified by the presence of the second dipolar BEC. For sufficiently small b, the presence of the second dipolar BEC destabilizes the system dramatically. In this regime, the coupled system collapses through a mode that is notably different from the radial roton mode that induces the collapse of the uncoupled system. Finally, we comment on the shortcomings of an approach that neglects the dynamics in the z-direction, which is assumed to be a good approximation for highly pancake-shaped dipolar BECs in the literature.

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