Description of Additional Supplementary Files

File Name: Supplementary Movie 1  
Description: Evolution to static sync state for \((J, K) = (0.1, 1)\)

File Name: Supplementary Movie 2  
Description: Evolution to static async state for \((J, K) = (0.1, -1)\)

File Name: Supplementary Movie 3  
Description: Evolution to static phase wave state for \((J, K) = (0.1, -1)\)

File Name: Supplementary Movie 4  
Description: Evolution to splintered phase wave state for \((J, K) = (1.0, -0.1)\)

File Name: Supplementary Movie 5  
Description: Evolution to active phase wave state for \((J, K) = (1.0, -0.75)\)

File Name: Supplementary Movie 6  
Description: Evolution to splintered phase wave state in the \((\phi, \theta)\) plane for \((J, K) = (1.0, -0.1)\)

File Name: Supplementary Movie 7  
Description: Evolution to active phase wave state in the \((\phi, \theta)\) plane \((J, K) = (1.0, -0.75)\)

File Name: Supplementary Movie 8  
Description: Evolution to non-stationary phase wave state in the \((\phi, \theta)\) plane \((J, K) = (1.0, -0.75)\)

File Name: Supplementary Movie 9  
Description: Evolution to the static async state in 3D for \((J, K) = (0.5, -1)\)

File Name: Supplementary Movie 10  
Description: Evolution to the static phase wave state in 3D for \((J, K) = (0.5, 0)\)

File Name: Supplementary Movie 11  
Description: Evolution to the splintered phase wave state in 3D for \((J, K) = (0.5, -0.05)\)

File Name: Supplementary Movie 12  
Description: Evolution to the active phase wave state in 3D for \((J, K) = (0.5, -0.6)\)