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Chimera States in Neural Oscillators SONYA BAHAR, TERA GLAZE, Dept of Physics and Astronomy and Center for Neurodynamics, University of Missouri at St. Louis — Chimera states have recently been explored both theoretically and experimentally, in various coupled nonlinear oscillators, ranging from phase-oscillator models to coupled chemical reactions. In a chimera state, both coherent and incoherent (or synchronized and desynchronized) states occur simultaneously in populations of identical oscillators. We investigate chimera behavior in a population of neural oscillators using the Huber-Braun model, a Hodgkin-Huxley-like model originally developed to characterize the temperature-dependent bursting behavior of mammalian cold receptors. One population of neurons is allowed to synchronize, with each neuron receiving input from all the others in its group (global within-group coupling). Subsequently, a second population of identical neurons is placed under an identical global within-group coupling, and the two populations are also coupled to each other (between-group coupling). For certain values of the coupling constants, the neurons in the two populations exhibit radically different synchronization behavior. We will discuss the range of chimera activity in the model, and discuss its implications for actual neural activity, such as unihemispheric sleep.

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