1125-35-834 **Bin Xu*** (xu@math.utah.edu), 155 S 1400 E, ROOM 233, Salt Lake City, UT 84102, and **Paul Bressloff** (bressloff@math.utah.edu), 155 S 1400 E, ROOM233, Salt Lake City, UT 84102. *A theory of synchrony for active compartments with delayed coupled through bulk diffusion.*

We consider two well-mixed, identical compartments located at either end of a bounded, one-dimensional domain. The compartments can exchange signaling molecules with the bulk domain where the signaling molecules undergo diffusion. The concentration of signaling molecules within each compartment is modeled by a delay differential equation (DDE), while the concentration in the bulk medium is modeled by a partial differential equation (PDE) for diffusion. Coupling in the resulting PDE-DDE system is via flux terms at the boundaries. One interpretation of the model is in terms of a single rod-like cell such as fission yeast, with each compartment a dynamically active membrane at the ends of the cell and the bulk domain representing the cytoplasm. Using linear stability analysis, numerical simulations and bifurcation analysis, we investigate the effect of diffusion on the onset of a supercritical Hopf bifurcation. The direction of the Hopf bifurcation is determined by numerical simulations and a winding number argument. Near a Hopf bifurcation point, we find that there are synchronized oscillations with two possible modes: in-phase and anti-phase. Our numerical result suggests that the selection of the in-phase or anti-phase oscillation is sensitive to delayed feedback. (Received September 12, 2016)