1106-92-2072 **Andrew T Sornborger*** (ats@math.ucdavis.edu) and **Louis Tao**. *Re-entrant neural circuits for actively controlled operator splitting.*

We have shown that pulse-gated synfire chains can exactly (in the mean) propagate information in the form of graded current amplitudes. Furthermore, with appropriate pulse sequences, current amplitudes may be dynamically routed through neural subcircuits. A considerable literature shows that coherent pulse trains in neural circuits can improve feature recognition, mediate interactions between neurons and modulate learning and memory. We have proposed that pulse-gated synfire chains are the theoretical mechanism responsible for this observed coherent activity. In a framework based on our pulse-gating mechanism, we have described methods for constructing neural circuits capable of actively controlling sequences of linear maps. In this paper, we demonstrate a neural circuit that combines split operator methods with re-entrant synaptic connectivity and pulse-gated control to create arbitrary rotations of vector coordinates on the sphere. (Received September 15, 2014)