1067-41-1613 **Jameson Cahill**, **Pete Casazza** and **Shidong Li*** (shidong@sfsu.edu), Department of Mathematics, San Francisco State University, San Francisco, CA 94132. *Sparsity of the fusion frame operator and nonorthogonal fusion frames.*

Fusion Frames study ways in which functions or signals from a set of subspaces can be combined coherently regardless how complicated subspaces are related. It has a deep root in data fusion applications for distributed systems such as sensor networks. Nevertheless, it has been seen that the fusion operation involves a fusion frame operator that is seldom sparse. While some applications can enjoy powerful constructions of Parseval fusion frames, a lot more distributed systems do not have the luxury for subspace selections, nor for subspace transformations or rotations. Non-orthogonal fusion frames extend fusion frames in which non-orthogonal projections become fundamental building blocks. We show that not only the (non-orthogonal) fusion frame operator can become sparse, it can also be made diagonal. Multi-fusion frames are also naturally introduced. As a result, the set of underlying subspaces no longer needs to be complete. Tight (non-orthogonal) fusion frames can be built based on one proper subspace. Simple and natural implementation of the non-orthogonal fusion frames via pseudoframes for subspace will be discussed. Comments on related works and why projections are necessary tools will be provided. (Received September 21, 2010)