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Victor Kaftal* (victor.kaftal@uc.edu), **Ping W Ng** and **Shuang Zhang**. *Finite sums of projections*.

In their paper "Ellipsoidal tight frames and projection decompositions of operators" in the Illinois J of Math. (2004) Dykema, Freeman, Kornelson, Larson, Ordower, and Weber investigate when is a positive Hilbert space operator the frame operator of an equal norm frame (equivalently, when is it a sum of rank one projections). A necessary and sufficient condition was presented by the authors in JFA (2009) in terms of the excess and defect part of the operator.

Harder is the question: when is a positive Hilbert space operator the frame operator of a finite union of orthonormal bases (equivalently, when is it a finite sum of projections).

A sufficient condition is that the essential norm of the operator is larger than one. We will mention several different proofs of this result. One of these proofs extends to Cuntz algebras ($n < \infty$) which are well-known in C*-theory.

A necessary condition is given through frame theory methods in terms of the principal ideals generated by the excess and defect parts of the operator. (Received September 21, 2010)