1080-05-356 **Carolyn Chun** (chchchun@gmail.com), Wellington, New Zealand, **Dillon Mayhew** (dillon.mayhew@msor.vuw.ac.nz), Wellington, New Zealand, and **Mike Newman*** (mnewman@uottawa.ca), Ottawa, Canada. *On sixth-root-of-unity matroids.* Preliminary report.

We are motivated by the desire to have a "nice" decomposition theorem for the strictly sixth-root-of-unity matroids, namely those that are representable over GF(3), GF(4) but not GF(5). Perhaps the nicest interpretation of the word "nice" would be along the lines of Seymour's decomposition theorem for regular matroids: we would have a finite number of natural classes and a finite number of sporadic matroids as building blocks, and we can glue these together using 1-sums, 2-sums or 3-sums.

Regular matroids would be one of the natural classes. It was at one time thought that the only sporadic matroid was $\mathrm{AG}(2,3) \setminus e$. This is known not to be the only sporadic matroid, and in this talk we further give an infinite family of sporadic matroids.

Specifically, we will say (for the purposes of this abstract) that a matroid is indecomposable if it is strictly sixth-root-of-unity, is 3-connected, and if X, Y is a 3-separation then either $\min\{r(X), r(Y)\} \leq 2$ or $\min\{r^*(X), r^*(Y)\} \leq 2$. We give an infinite family of indecomposable non-regular matroids. Much of our proof is not limited to sixth-root-of-unity, and, in principle at least, could be applied to other classes. (Received January 31, 2012)