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Dillon Mayhew* (dillon.mayhew@mcs.vuw.ac.nz), School of Mathematics, Victoria University of Wellington, PO BOX 600, Wellington, New Zealand, and **Gordon Royle** and **Geoff Whittle**.

Binary matroids with no $M(K_{3,3})$ -minor.

We have recently characterized the internally 4-connected binary matroids with no minor isomorphic to $M(K_{3,3})$. Any such matroid is either (i) cographic, or (ii) isomorphic to a particular single-element extension of the bond matroid of a Möbius ladder, or (iii) isomorphic to one of eighteen sporadic matroids. In this talk we will sketch the structure of the proof, including a description of a new connectivity chain theorem. We will also outline a polynomial-time algorithm which decides whether a binary matroid (represented by a matrix over $\text{GF}(2)$) has an $M(K_{3,3})$ -minor. (Received February 04, 2008)