

# Cographic excluded-minors for the class of gain-graphic matroids

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## Abstract

Gain-graphic matroids are important examples when studying minor-closed classes of matroids. A gain-graphic matroid is defined on the set of edges of a multigraph with the edges labeled by the elements of a group. In this talk, we investigate the cographic excluded-minors for the class of gain-graphic matroids. Our main result is the following. For a graph  $G$ , its cographic matroid is gain-graphic over an odd ordered group if and only if  $G$  is planar; its cographic matroid is gain-graphic over an even ordered group if and only if  $G$  is projective planar.

This is joint work with Thomas Dowling.