

# Circular Coloring of Planar Graphs

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## Abstract

Grötzsch proved that every planar graph without triangles is 3-colorable. In this talk we look at planar graphs with high girth (no short cycles). Since every odd length cycle needs 3 colors, we study a refinement called *circular coloring*. We think of this as mapping vertices of our planar graph  $G$  to the vertices of an odd cycle, say  $C_5$  or  $C_7$ , so that every pair of adjacent vertices in  $G$  gets mapped to adjacent vertices in the odd cycle. (Mapping a graph  $G$  to  $C_3$  is the same as finding a 3-coloring of  $G$ .) We give sufficient conditions to map the vertices of  $G$  to either  $C_5$  or  $C_7$ . – This is joint work with Jiaao Li, of Nankai University, China.

**Keywords:** planar graph, vertex coloring, circular coloring.