

4:00 PM, MONDAY, APRIL 16, 2007, BOYD 304

Speaker: **Prof. Rong Luo**, Department of Mathematical Sciences, Middle Tennessee State University, Murfreesboro, Tennessee

Title: **Recent results on Vizing's edge coloring conjectures**

Edge colorings of graphs (in which the edges are colored so that two edges that meet at a vertex must be colored differently) have been studied for a long time, for example in connection with the Four Color Conjecture (now Theorem). In 1960s some very significant work was done by Vizing, who proved that for simple graphs,  $\chi_e$ , the edge chromatic number, is either  $\Delta$ , the maximum degree, or  $\Delta + 1$ . Most edge coloring problems involve what are known as  $\Delta$ -critical graphs (or simply called critical graphs). A graph  $G$  is critical if  $\chi_e(G) = \Delta + 1$  but  $\chi_e(H) \leq \Delta$  for any proper subgraph  $H$ . In late 1960s, Vizing proposed four conjectures on edge colorings.

- (a) Vizing's Planar Graph Conjecture (Vizing, 1965), or more generally, to determine the maximum of the set of maximum degrees of simple graphs that are class two and can be embedded in a surface of characteristic  $\epsilon$ ;
- (b) Vizing's Conjecture on lower bounds for the size of critical graphs (Vizing, 1965);
- (c) Vizing's Conjecture on the independence number  $\alpha$  of critical graphs (Vizing, 1968);
- (d) Vizing's 2-Factor Conjecture on critical graphs (Vizing, 1965).

All the problems listed above have been around for almost forty years, but still remain unsolved. In this talk I will talk about the relation among those problems and the progress we made in the past a couple of years. This is joint work with Yue Zhao from the University of Central Florida

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