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Suil O* (suilo2@math.uiuc.edu), 409 W. Green Street, Urbana, IL 61801, and **Sebastian Cioaba** and **Douglas B West**. *Usage of Balloons in Regular Graphs*. Preliminary report.

Petersen proved that every cubic graph without cut-edges has a perfect matching, but some graphs with cut-edges have no perfect matching. The smallest cubic graph with no perfect matching belongs to a general family applicable to many problems on connected d -regular graphs with n vertices. These include the smallest matching number for such graphs and a relationship between the eigenvalues and the matching number. In addition to these results, we present new results involving this family and the Chinese Postman Problem and a relationship between eigenvalues and edge-connectivity in regular graphs. (Received December 14, 2010)