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Ali Mohammadian* (ali_m@ipm.ir), School of Mathematics, Institute for Research, in Fundamental Sciences (IPM), P.O. Box 19395-5746, Tehran, Iran. *The Structure of Zero-Divisor Graphs*. Preliminary report.

The set of zero-divisors in a ring R does not have any obvious algebraic structure in general. If R is commutative, then this set is just a semi-group under multiplication. For this reason, it seems appropriate to use non-algebraic methods to study this set. One such approach involves the so-called zero-divisor graph. The zero-divisor graph $\Gamma(R)$ of a ring R is the graph whose vertices consist of the non-zero zero-divisors of R in which two distinct vertices a and b are adjacent if and only if either $ab = 0$ or $ba = 0$. In exploring the relationship between a finite ring R and the graph $\Gamma(R)$, various problems are considered as follows: (i) The isomorphism problem: “For two finite rings R and S , are rings R and S isomorphic when graphs $\Gamma(R)$ and $\Gamma(S)$ are isomorphic?” (ii) The classification problem: “For a finite ring R , when $\Gamma(R)$ has a special graph-theoretic property?” In this talk, we characterize all non-local finite rings whose zero-divisor graphs are complete multipartite. We also provide a classification of the finite rings whose zero-divisor graphs have cut vertices. Finally, we present some open problems and conjectures about the zero-divisor graphs. (Received July 02, 2012)