

Contents

1	Introduction	1
1.1	Network Science: An Emerging Discipline	1
1.2	Percolation in Networks	2
1.3	Explosive Percolation: A Continuous or Discontinuous Transition?	3
	References	5
2	Discontinuous Explosive Percolation with Multiple Giant Components	9
2.1	Introduction	9
2.2	Results	9
2.3	Summary and Discussion	15
	References	16
3	Deriving an Underlying Mechanism for Discontinuous Percolation Transitions	17
3.1	Introduction	17
3.2	Model	18
3.3	Methods and Results	19
3.4	Summary	25
	References	26
4	Continuous Phase Transitions in Supercritical Explosive Percolation	29
4.1	Introduction	29
4.2	The BFW Model and the Discontinuous Transition of the Largest Component	31
4.3	Growth Cessation of the Largest Component	34
4.4	Continuous Transition of the Second Largest Component	36
4.5	Summary and Discussion	42
	References	43

5 Unstable Supercritical Discontinuous Percolation

Transitions 47

5.1 Introduction 47

5.2 Percolation Models with Global Continuity 48

5.3 Percolation Models with Discontinuities 50

5.4 Bohman–Frieze–Wormald Model 51

5.5 Phase Diagram of the BFW Model 55

5.6 Summary and Discussions 56

References 58

Appendix A. 61

Index 63