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Universal features of dynamic small-world networks THOMAS STONE, Husson University, SUSAN MCKAY, University of Maine — In a dynamic small-world contact network, an individual has fixed short range links within its local neighborhood and time-varying stochastic long range links outside of that neighborhood. The probability of a long range link occurring (p, in analogy with the standard small-world rewiring parameter) is a measure of the mobility of the population. In this study we investigate the epidemic to non-epidemic phase transition that occurs in a susceptible-infected-recovered (SIR) disease spreading model located on this type of dynamic network. We first derive the finite-valued critical mobility p_c and find excellent agreement with numerical simulations. Close to p_c the outbreak size scales as $(p\text{-}p_c)^{\beta}$ since it is a continuous transition; we find that β is near 2, but varies as a function of the infectivity and recovery rates. At the critical point our study shows that the distribution of outbreak sizes scales as $\sim N^{-\alpha}$ with $\alpha = 1.5 \pm 0.03$. We compare these critical exponents to those found in related small-world and dynamic small-world networks and comment on potential universality.

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