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Renormalization Group Treatment of the Trapping Reaction JACK HANSON, Rutgers University, SCOTT MCISAAC, Rice University, BENJAMIN VOLLMAYR-LEE, Bucknell University — We consider the trapping reaction $A+B \to A$, with diffusing traps (A) and particles (B), where the traps additionally undergo either an annihilation ($A+A \to \emptyset$) or coalescence ($A+A \to A$) reaction. This two-species reaction-diffusion system exhibits asymptotic power law decays in both the trap and particle densities, and simple scaling in the trap-trap (AA) and particle-trap (AB) correlation functions. However, simulations indicate the induced particle-particle correlations scale as $C_{BB}(x,t) = t^{\phi} f(x/t^{1/2})$ with an anomalous dimension ϕ [B.P. V-L and R.C. Rhoades]. We perform a one-loop renormalization group calculation of this exponent for $d < 2$ — which involves 59 diagrams — and demonstrate that the anomalous dimension is universal and is due to a renormalization of the initial particle density. Our results are compared to the simulation data.

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