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**Robert Buckingham\***, buckinrt@uc.edu. *Large-order asymptotics for multiple pole solitons of the focusing NLS equation.*

We analyze the large-order behavior of multiple-pole solitons of the focusing NLS equation using the nonlinear steepest-descent method for Riemann-Hilbert problems. For moderate values of the pole order we obtain exact solutions, revealing highly oscillatory and quiescent regions. We compute the boundary of the quiescent regions exactly and prove the asymptotic limit of the solitons is zero in these regions. In a scaled neighborhood of the central peak we prove that the solitons converge to functions satisfying the second member of the Painleve-III hierarchy in the sense of Sakka. This function is a generalization of a function recently identified by Suleimanov in the context of geometric optics and by Bilman, Ling, and Miller in the context of rogue wave solutions to the focusing NLS equation. This is joint work with Deniz Bilman. (Received August 20, 2018)