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An extrapolated Peaceman-Rachford-Strang splitting method is designed and examined in application to semidiscretized parabolic partial differential equations. A multiproduct expansion method (MPE) is implemented to improve the order of accuracy beyond second order in time. The numerical analysis of the high order splitting method is further validated and illustrated through numerical experiments of linear and nonlinear partial differential equations. (Received September 15, 2014)