Asymptotic-preserving and well-balanced uncertainty quantification for kinetic and hyperbolic equations

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In this talk we will study the generalized polynomial chaos (gPC) approach to hyperbolic and kinetic equations with uncertain coefficients/inputs, and multiple time or space scales, and show that they can be made asymptotic-preserving or well-balanced, in the sense that the gPC scheme preserves various asymptotic limits in the discrete space. This allows the implemention of the gPC methods for these problems without numerically resolving (by space, time, and gPC modes) the small scales.