

## **Forward and Backward Uncertainty Propagation in Non-linear Shock-dominated Problems**

Didier Lucor, CNRS / Pierre & Marie Curie University

Forward and backward uncertainty propagation in non-linear shock-dominated problems Shock wave-dominated systems are very sensitive to uncertainties in initial or boundary conditions as they often give rise to strong non-linear responses when subject to perturbations. As global numerical approximations are not well suited to capture local parametric fronts/shocks/gradients, adaptive methods have been proposed in this stochastic context. We will review some intrusive and non-intrusive adaptive spectral methods developed for this purpose. We will show how they can also accelerate Bayesian inference in inverse problems where the forward uncertainty propagation model exhibits strong nonlinear behavior over the support of the prior distribution. The numerical methods will be applied to several test cases with different levels of regularity, dimensionality and complexity, including the case of compressible gas dynamics.