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Reacting flow simulations using high-order discontinuous Galerkin methods[1] KIHIRO BANDO, MATTHIAS IHME, Stanford University, MICHAEL SEKACHEV, Total — High-order discontinuous Galerkin (DG) methods have been an increasingly popular topic of research for enabling high-fidelity simulations on complex geometries. They present several attractive features such as high-order accuracy on arbitrary mesh topologies, compact implementation and support of advanced *hp*-refinement strategies which can be leveraged to increase computational efficiency. However, the application of such methods to flows presenting complex thermodynamics and chemical reactions is still sparse. In particular, the accurate prediction of such flows requires the consideration of complex transport and the treatment of stiff reaction chemistry. This talk will discuss challenges associated with reacting flow simulations in the context of a DG discretization. Simple one-dimensional cases will first be investigated to gain insight at the fundamental properties of the scheme when applied to such flows. Subsequently, more challenging cases in multiple dimensions will be examined to highlight the performance as well as the need for further developments to enable reacting flow simulations using DG methods.

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Kihiro Bando
Stanford University

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