A New Class of Fully-Implicit-Explicit Time Integrators
Tommaso Buvoli
(Tulane University)
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In this talk I will present a new class of full-implicit-explicit (FIMEX) integrators where the implicit component is equivalent to a fully-implicit Runge-Kutta method with Radau nodes, and the explicit component is a GLM. These new methods are derived using an additive extension of a polynomial time integration framework that uses continuous interpolating polynomials to simplify the construction of new integrators. I will briefly introduce the framework, discuss the stability of the new IMEX methods, and show several numerical results that make use of recently developed preconditioning techniques for solving the fully implicit component. We will see how for finite-element discretizations the new IMEX methods can obtain significantly improved accuracy, stability, and efficiency compared to existing IMEX Runge-Kutta methods.