Abstract Submitted
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On the effect of wake passing on a low pressure turbine cascade using spectral/*hp* element methods[1] ANDREA CASSINELLI, Imperial College London, PAOLO ADAMI, Rolls-Royce plc., FRANCESCO MONTOMOLI, SPENCER J SHERWIN, Imperial College London — The developing and future interaction of HPC, high fidelity CFD and high order unstructured grid algorithms has the potential to allow for simulation-based research, analysis and design capability. Previous work focused on developing guidelines to leverage the use of high order spectral/*hp* element methods as a virtual cascade for turbomachinery applications. Building on the knowledge previously reported, we analyze a representative industrial low pressure turbine cascade subject to wake passing interactions at moderate Reynolds number, adopting the incompressible Navier-Stokes solver implemented in the Nektar++ software framework. The rotor-stator interaction is modelled by imposing appropriate Dirichlet boundary conditions. The impact of flow coefficient and reduced frequency is studied in conjunction with the Reynolds sensitivity. The analysis focuses in detail on the dynamics of the separation bubble on the suction surface looking at mean flow properties and turbulence kinetic energy budgets, comparing the main findings with experimental data.

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