

# **Abstract: Numerical study of supersonic turbulent boundary layer drag control and vortex reconnection cascade at high Reynolds numbers, Y1**

This proposal is a request for 52,000 SUs (node hours) of computer time on TACC STAMPEDE2 (SKX nodes) along with 50 TB of archival storage on TACC RANCH, to be used in our ongoing studies of active turbulent skin-friction drag reduction (DR) and vortex reconnection cascade. For drag control, we would perform direct numerical simulation of drag control with spanwise wall oscillation for supersonic turbulent channel flows at bulk Reynolds number  $Re_b = 17000$  and bulk Mach number  $M_b = 1.5$  and 3. The new results, in combination with our previous study at lower Reynolds and Mach numbers, would enable us to obtain a clear Reynolds and Mach number scaling, which is of great importance to evaluate the capability of drag control method at high practical situation. For the vortex reconnection studies, the main goal is to improve the parallel efficiency of our code so that we can be ready to perform simulation at high Reynolds numbers, which is essential for understanding the vortex reconnection cascade mechanism and its relationship to turbulence cascade.