**RESEARCH CHALLENGE**

Numerical simulations of TDEs of Sun-like stars by supermassive BHs are extremely challenging because it is difficult to numerically resolve the debris stream because it is very thin relative to the black hole. Tilted disk simulations require high resolution to properly resolve nonaxisymmetric turbulence in the tilted disks. Both are huge numerical challenges.

**METHODS & CODES**

Using our new code H-AMR (pronounced “hammer”), which includes adaptive mesh refinement and efficiently runs on GPUs, we were able to overcome these challenges.

**RESULTS & IMPACT**

Until now, many different simplifications have been adopted when simulating TDEs. For instance, to save computational time, (1) stars were sent in on closed, elliptic orbits (instead of parabolic ones) or (2) the BH-to-stellar ratio order of magnitude was assumed to be lower than in reality (e.g., 1,000 instead of 10⁶) [1,2].

**WHY BLUE WATERS**

Our simulations require a high degree of parallelism as they run on hundreds to thousands of GPUs in parallel.