Proposal Title (exactly as it appears on submission): Revealing the Physics of Galactic Winds with Petascale GPU Simulations

Year 1			
Milestone	**Details**	**Dates**	**Status (renewals only)**
RM.A Create and test initial conditions for galactic disk simulations.	**Resources:** Titan **Core hours:** 500,000 **Filesystem storage (TB and dates):** 10 TB, 04/17 - 08/17 **Archival storage (TB and dates):** N/A **Software Application:** Cholla **Tasks:** Add static gravity to Cholla; Develop isothermal disk models in hydrostatic equilibrium with background potential; Develop adiabatic halo model in hydrostatic equilibrium with background potential; Demonstrate stability of ICs over gigayear timescales **Dependencies:** N/A	01/17 - 06/17	Completed
RM.B Implement and calibrate feedback model for driving galactic outflows.	**Resources:** Titan **Core hours:** 1,000,000 **Filesystem storage (TB and dates):** 5 TB, 06/17 - 12/17 **Archival storage (TB and dates):** N/A **Software Application:** Cholla **Tasks:** Design and implement feedback scheme **Dependencies:** RM.A	06/17 - 07/17	Completed
RM.C Model the multiphase structure and radiative cooling of galactic outflows on ∼10kpc scales	**Resources:** Titan; Rhea **Core hours:** 22,000,000 **Filesystem storage (TB and dates):** 40 TB, 05/17 - 12/17 **Archival storage (TB and dates):** ∼75 TB, 08/17 - 01/18 **Software Application:** Cholla **Tasks:** Test different feedback parameters; Adjust cooling model as necessary; Run two production simulations; Analyze results **Dependencies:** RM.A, RM.B	07/17 - 12/17	In Progress
RM.D Determine the role of full three-dimensionality on the velocity and density structure of galactic outflows	**Resources:** Titan; Rhea **Core hours:** 22,000,000 **Filesystem storage (TB and dates):** 40 TB, 08/17 - 12/17 **Archival storage (TB and dates):** ∼75 TB, 08/17 - 01/18 **Software Application:** Cholla **Tasks:** Test different feedback parameters; Adjust cooling model as necessary; Run two production simulations; Analyze results **Dependencies:** RM.A, RM.B	07/17 - 12/17	In Progress

Year 2 (if appropriate)			
Milestone	**Details**	**Dates**	**Status (renewals only)**
RM.E Implement and calibrate discrete supernova feedback model for driving galactic outflows. (New)	**Resources:** Titan **Core hours:** 1,500,000 **Filesystem storage (TB and dates):** 5 TB, 01/18 - 04/18 **Archival storage (TB and dates):** N/A **Software Application:** Cholla **Tasks:** Devise and calibrate two discrete supernova feedback schemes **Dependencies:** RM.A	01/18 - 04/18	In Progress
RM.F Model the multiphase structure and radiative cooling of galactic outflows on ∼10 kpc scales, including driving by discrete supernovae.	**Resources:** Titan, Rhea **Core hours:** 22,000,000 **Filesystem storage (TB and dates):** 40 TB, 01/18- 06/18 **Archival storage (TB and dates):** ∼80 TB, 01/18 - 12/18 **Software Application:** Cholla **Tasks:** Run two production simulations; Analyze results **Dependencies:** RM.A, RM.E	03/18 - 06/18	Not Started
RM.G Simulate galactic outflows at large dynamic range to generate *ab initio* ∼10 kpc-scale winds from ∼pc-scale supernova bubbles.	**Resources:** Titan, Rhea **Core hours:** 32,000,000 **Filesystem storage (TB and dates):** ∼50 TB, 07/18- 12/18 **Archival storage (TB and dates):** ∼50 TB, 07/18 - 12/18 **Software Application:** Cholla **Tasks:** Run high-resolution production simulation; Analyze results **Dependencies:** RM.A, RM.E, RM.F	07/18 - 12/18	Not Started