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Bow shocks formed by massive runaway stars in 3D

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Hyper-runaways are stars moving at supersonic speeds through the interstellar medium; they can be thought of as a subset of runaway stars but moving with velocities that are comparable to the Galactic escape velocity ($\sim$ 500 km/s). Because of the strong stellar winds and high space velocities, we expect massive (hyper)runaway stars to produce bow shocks. We use PLUTO, a magneto-hydrodynamics grid code, to simulate these bow shocks, performing axi-symmetric hydrodynamic simulations in 3-dimensions while including thermal conduction and detailed radiative cooling processes. In this talk we will present our results for a range of stellar velocities ($100 \leq v_{\rm star} \leq 500$ km/s) and discuss the implications for potentially observing hyper-runaways.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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