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Simulations of stellar winds from X-ray bursts: Characterization of solutions and observable variables.

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- Context: Recent studies have suggested that a variety of heavy elements, whose origin is still debated, is synthesized as a result of nuclear reactions during X-ray bursts. The predicted luminosities indicate these heavy elements may escape neutron stars gravity through a radiative stellar wind, thus contributing to the observed galactic abundances. Stellar wind models, though studied in past decades, have thus regained interest and need to be revisited with updated data and methods.
- Aims: In this work we study the radiative wind model and its feasibility in the context of XRBs, with modern techniques and physics input. We focus on characterization of the solutions and study of observable magnitudes as a function of free model parameters.
- Methods: We implement a spherically-symmetric non-relativistic wind model in a stationary regime, with updated opacity tables and modern numerical techniques. Total mass and energy outflows $(\dot{M}, \dot{E})$ are treated as free parameters.
- Results: Solutions were found to transition from pressure-driven in the inner layers to radiatively-driven as the wind becomes supersonic. A high resolution parameter space exploration was performed to allow better characterization of observable magnitudes. High correlation was found between different photospheric magnitudes and free parameters. For instance, the photospheric ratio of gravitational energy outflow to radiative luminosity is in direct proportion to the photospheric wind velocity.
- Conclusions: We believe that the correlations found are of great importance and they can help determine the physical conditions of the inner layers, where nuclear reactions take place, by means of observable photospheric values.

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