

Particle acceleration in winds of stellar clusters:

executive summary

Context:

- ❖ Several massive stellar clusters have been associated to gamma-ray sources, suggesting that they could contribute to the bulk of Galactic component of cosmic rays.
- ❖ **Where those particles are accelerated?**

Method:

- ❖ We investigated the spectrum of protons accelerated at the **termination shock of stellar winds**, developing a technique to solve the transport equation in spherical symmetry able to account for *space-dependent* wind velocity and *space- and energy-dependent* particle diffusion.

Results:

- ❖ We show that the maximum energy can reach the **PeV for very massive stellar cluster** under the assumption that few percent of the wind kinetic energy is converted into magnetic turbulence and that diffusion is close to *Bohm*.
- ❖ The spatial profile of the accelerated particles is also presented and discussed
 - ♦ **important to predict the morphology of gamma-ray emission**
 - ♦ f_{CR} inside the bubble is flat at low energies; the $\sim 1/r$ shape inferred from some analysis is difficult to recover