Executive Summary: Exploring galactic wind superbubbles by multimessenger observations

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• WHAT IS THE CONTRIBUTION ABOUT?

The contribution discusses a theoretical model for particle acceleration, transport and associated multimessenger emission (gamma rays, neutrinos and escaping protons) in galactic winds powered by starburst or AGN activity.

• WHY IS IT RELEVANT / INTERESTING?

Powerful winds are ubiquitous in starburst and active galaxies. Their power content and physical conditions are extremely promising for acceleration and transport of high-energy particles, while the potential implications in terms of gamma-rays, neutrinos and escaping cosmic rays are still poorly explored. Therefore, this work is relevant because aims to investigate how particle acceleration and production of multimessenger byproducts associated to the transport can take place in these sources.

• WHAT HAVE WE DONE?

We model diffusive shock acceleration and transport of high energy particles in galactic wind superbubbles. We compute their multimessenger emission focusing on gamma-rays, neutrinos and escaping protons. We perform a parameter space exploration scanning different scenarios of wind speed and wind mass loss rate. We focus in particular on the maximum energy of accelerated particles and total luminosity.

• WHAT IS THE RESULT?

Particles can be efficiently accelerated at the wind termination shocks of galactic wind bubble powered by starburst and AGN. We find that protons can be accelerated from 0.1 to 10^2 PeV in these systems. Energies up to EeV might be reached in the most powerful sources. The luminosity of galactic wind bubbles makes them promising objects for next generation observatories.