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Particle acceleration and multi-messenger radiation from extragalactic outflows

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Winds and outflows are ubiquitous at several scales throughout the Cosmos.They often develop a bubble structure characterized by strong shocks and turbulence where high-energy particles can be efficiently produced.
I will present a model in which diffusive shock acceleration is a
key process to energize particles in such astrophysical winds.
I will show some model applications in the context of starburst galaxies and active galactic nuclei and I will discuss the associated multi-messenger implications in terms of high-energy photons, neutrinos and escaping cosmic rays.

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