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KINEMATICS OF THE IONIZED GAS IN NEARBY GALAXIES AS DIAGNOSTICS OF THE ENERGY BALANCE BETWEEN ISM AND MASSIVE STARS

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Stellar feedback is a key contributor to the regulation of the morphology and dynamics of the interstellar medium in star-forming galaxies. Integral-field spectroscopy of nearby galaxies reveals signatures of ubiquitous supersonic motions of the ionized gas manifesting themselves in broadening or asymmetries of bright emission lines. The study of expanding ionized superbubbles and turbulent gas motions producing these features enables quantitative constraints to be placed on the energetics of stellar feedback. I will present the analysis of the small-scale ($\sim 30-500$ pc) ionized gas kinematics in very nearby dwarf galaxies ($D < 5$ Mpc, mostly from Local and M81 groups) and more distant spiral galaxies ($D = 8 - 20$ Mpc, from PHANGS survey) based on their observations with the scanning Fabry-Perot interferometer at the 6-m BTA and with the integral-field spectrograph MUSE at the 8-m VLT telescopes. We found $\sim$ 1500 regions of locally elevated velocity dispersion and argue that stellar feedback is the dominant source for powering the ionized gas in these regions, with a typical efficiency of 10-20%, in agreement with hydrodynamical simulations. Accounting for pre-supernovae feedback is required to set up the energy balance between gas and stars in these dynamically active regions. The measured kinetic energy of the ionized gas of superbubbles and turbulent gas motions decreases with metallicity reflecting the lower impact of stellar feedback in a low-metallicity environment.