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AGN in dwarf galaxies: frequency, triggering processes and the plausibility of AGN feedback

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While AGN are considered to be key drivers of the evolution of massive galaxies, their potentially significant role in the dwarf-galaxy regime (M < 10^9 MSun) remains largely unexplored. We combine optical and infrared data, from the Hyper Suprime-Cam (HSC) and the Wide-field Infrared Explorer (WISE) respectively, to explore the properties of ~800 AGN in dwarfs at low redshift (z<0.3). Infrared-selected AGN fractions are ~10-30 per cent in dwarfs, which, for reasonable duty cycles, indicates a high BH-occupation fraction. Visual inspection of the deep HSC images indicates that the merger fraction in dwarf AGN ~6 per cent) shows no excess compared to a control sample of non-AGN, suggesting that the AGN-triggering processes are secular in nature. Energetic arguments indicate that, in both dwarfs and massive galaxies, bolometric AGN luminosities (L_AGN) are significantly greater than supernova luminosities (L_SN). Together with the potentially high BH-occupation fraction, this suggests that, if AGN feedback is an important driver of massive-galaxy evolution, the same is likely to be true in the dwarf regime, contrary to our classical thinking. We then compare these empirical results to predictions from the New Horizon simulation in order to gain an understanding of how well state-of-the-art simulations currently reproduce the black-hole properties of dwarf galaxies.

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