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The effect of AGN feedback on shape of dark matter haloes

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Galaxy haloes evolve through complex structure formation processes. Feedback from active galactic nuclei (AGN) plays an important role on the formation and matter distribution in haloes. We investigate the effect of AGN feedback on the shape of dark haloes formed in the EAGLE simulations and trace the evolution. Haloes from the 50 Mpc box simulation with and without AGN feedback are extracted at redshifts 0, 0.25 and 0.87, with high ($10^{13} - 10^{14.5} M$), intermediate ($10^{12} - 10^{12.5} M$), and low ($10^{11} - 10^{11.5} M$) mass ranges, containing approximately 20, 100 and 800 haloes at redshift 0, respectively. We average the triaxiality profile of haloes in each mass range at different redshifts. The triaxiality at r_{200} for the highest mass range for both simulations is simililar at all redshifts, but differ near the centre ($r < 0.1 r_{200}$). The effect of AGN on the shape is more pronounced at low and intermediate mass ranges, with haloes in the AGN simulation progressively become more prolate internally as they evolve to the present. However, shape of individual dark haloes may also be affected by other processes. We follow the evolution of triaxiality of 3 most massive haloes and find that outside $0.1 r_{200}$ the haloes exhibit change of shape erratically which could be due to merging. We conclude that AGN can affect the internal shape of haloes particularly in low and intermediate mass ranges, and that haloes are triaxial objects as a result of undergoing structural change through time.

Author: NAREE, Netipon (Department of Physics, Khon Kaen University)

Co-author: MUANWONG, Orrarujee (Department of Physics, Khon Kaen University)

Presenter: NAREE, Netipon (Department of Physics, Khon Kaen University)

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