

The Origin of Cold Gas in Low Excitation Radio Galaxies (LERGs)

Abstract

LERGs have been historically believed to be powered by inefficient accretion from the hot phase of the inter-galactic medium (IGM). Over the past decade, however, evidence has been growing that significant amounts of cold gas can be present in the centre of LERGs. The origin of this gas is still a subject of debate: it may be either internally generated through secular processes (stellar mass loss, hot gas cooling), or externally accreted through interactions or minor mergers. External accretion seems to be more important in poor groups, where the gravitational potential is shallower. An important role to disentangle the two scenarios can be played by studies of the neutral hydrogen (HI) component, that traces the bulk of the cold gas in galaxies, and is the most abundant gas phase in the IGM. We thus propose deep HI observations of LERGs in sparse environments and at different stages of their nuclear activity, to directly probe the role of the large-scale environment in determining the cold gas reservoirs observed in the centre of LERGs, and assess their fueling mechanisms.