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SPECTROSCOPIC ANALYSIS OF SPECIFIC ANGULAR MOMENTUM IN DISK GALAXIES

A. Lalović, M. Jovanović, S. Knežević and M. Stojanović

Astronomical Observatory, Volgina 7, 11060 Belgrade, Serbia

E-mail: ana@aob.rs

To better understand galaxy formation and evolution, we measure their specific angular momentum, a fundamental physical property thought to be conserved. Its correlation with baryonic mass — the so-called Fall relation — holds for galaxies across a wide range of masses, sizes, and gas content. This relation is shaped by both external and internal factors, which can provide insight into galaxy evolution pathways.

Radio interferometric observations of the HI line have revealed flat rotation curves extending to very large radii, making them ideal for measuring angular momentum. However, in their absence, more detailed and reliable IFU observations can be used, provided that stellar rotation velocities, derived from IFU data, are corrected for non-circular motions. Observations have shown that in disk-like galaxies, half of the specific angular momentum (sAM) is contained within one effective radius. Consequently, the total sAM can be measured for all such galaxies using IFU spectroscopy that spans at least one effective radius. We demonstrate that for the spiral galaxy NGC 3351, sAM can be fully recovered from the available IFU spectroscopy. The proposed method can significantly expand the current galaxy sample by several orders of magnitude.