

RINGED GALAXIES REVISITED: FORMATION OF RINGS IN BARRED GALAXIES

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Ringed galaxies contain a ring (or rings) in their disks. These rings are formed by internal processes, i.e. they are part of the secular evolution in galaxies. In most previous studies the formation of rings has been connected to the dynamical effect of a rotating stellar bar, more specifically to closed stellar orbits near resonances induced by the bar. However, some recent studies have challenged this view. ARRAKIS, the atlas of rings in the S4G-survey, contains a large number of non-barred galaxies that have rings. Furthermore, it has been pointed out that the so called manifold orbits, originating from unstable Lagrangian points near the ends of the bar, may have a strong role in the formation of both rings and spiral arms.

In this study we simulate the ring formation both in models with an analytical bar potential and in N-body models, where a bar forms through an instability in the stellar disk. We pay special attention to orbits forming the ring structures (closed periodic orbits and semiregular orbits, manifold orbits or something else), and how the ring formation, morphology and evolution depends on the different aspects of galaxy dynamics.