

# On the nature of low-luminous spiral galaxies

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Spiral structure (both flocculent and Grand Design) is very rarely observed in dwarf galaxies (dS), and its formation evidently requires some specific conditions. In this work we prepared a list of nearly 150 dS-galaxies found by viewing images of the late-type galaxies with  $B < 15$  m and  $M_B > -18$  m. By general properties as well as by the presence of a bar or isolation index these galaxies do not differ noticeably from dIrr or Sm-types of similar luminosity, velocity of rotation or specific angular momenta, except that they have an average lower gas (HI) content. Moreover, the spiral structure is practically absent in disks with rotation speed less than 60 km/s. We tested the possibility of spiral structures formation in dwarf galaxies due to gravitational instability of a disk by numerical simulations of self-consistent gravitating stellar-gas disk dynamics. Gas fraction, kinematic characteristics radial profiles, stellar and dark halo masses were varied. It is shown that the gravitational mechanism of spiral formation is effective only for gas rotation speed not less than 60-70 km/s, and a small relative thickness of a disk corresponding to its marginal stability. The reduced gas content in a significant part of dS-galaxies may be a result of more efficient star formation in thin disks.