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Truncations in Stellar Disks and Warps in HI-layers in Spiral Galaxies

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Abstract

Disks in spiral galaxies consist of stars and gas. The stellar disks show radially an exponential surface brightness distribution (and vertically one resembling an isothermal sheet), with relatively sharp truncations at of order 4 scalelengths. These truncations are most easily seen in edge-on galaxies. The evidence for these truncations and their statistics will be reviewed. Truncations appear to be not only truncations in the distribution of stars, but also in the total density. The origin of these truncations seem related to the maximum specific angular momentum in the material that formed the disks. Disks are extremely flat. The HI-gas often extends beyond the eructations in the stellar disks, but when they do they also show a warp. Again edge-on galaxies show this mostly readily. Analysis shows that the warps start abruptly, just beyond the truncation radius and some other properties also show abrupt changes at the radius of the onset of the warp. This suggests that warps are the result of infall of gas at later times, when the formation of the stellar disks has been completed. The different orientation indicates a that the gas in the reservoir from which the outer gas originates, has an orientation of its angular momentum different form that of the stellar disk. Most of this material is also covered in the recent review "Galactic Disks" by P.C. van der Kruit and K.C. Freeman in Annual Reviews, vol. 49, 301-371 (2011).