

## Bending instabilities at the origin of persistent warps: a new constraint on dark matter halos

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A substantial fraction of the warps observed in spiral galaxies may naturally result from bending instabilities if the disks are essentially self-gravitating. Based on N-body simulations, we show that realistic galactic disks, where the dark matter is essentially distributed in a disk, are subject to bending instabilities. S and U-shaped, as well as asymmetric warps are generated. In some cases, the warp may last during several galactic rotations. Because the bending instability is very sensitive to the flattening of the galactic potential, the fraction of dark matter distributed in the disk and in the dark halo are constrained. This mode of warping gives a unified picture of galaxies, where bars, spirals and warps result from disk instabilities.

POS (BDMH2004) 058

*BDMH 2004 – Baryons in Dark Matter Halos  
5–9 October 2004  
Novigrad (Croatia)*