

# Two types of distribution of the gas velocity dispersion of MaNGA galaxies

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## Abstract

The distribution of the gas velocity dispersion  $\sigma$  across the images of 1146 MaNGA galaxies is analyzed. We find that there are two types of distribution of the gas velocity dispersion across the images of galaxies: (i) the distributions of 909 galaxies show a radial symmetry with or without the  $\sigma$  enhancement at the center ("R distribution", radial symmetry in the  $\sigma$  distribution) and (ii) distributions with a band of enhanced  $\sigma$  along the minor axis in the images of 159 galaxies with or without the  $\sigma$  enhancement at the center ("B distribution", band in the  $\sigma$  distribution). The  $\sigma$  distribution across the images of 78 galaxies cannot be reliably classified. We select 806 galaxies with the best defined characteristics (this sample includes 687 galaxies with R distribution and 119 galaxies with B distribution) and compare the properties of galaxies with R and B distributions. We find that the median value of the gas velocity dispersion  $\sigma_m$  in galaxies with B distribution is higher by around 5 km s<sup>-1</sup>, on average, than that of galaxies with R distribution. The optical radius R<sub>25</sub> of galaxies with B distribution is lower by around 0.1 dex, on average, than that of galaxies with similar masses with R distribution. Thus the properties of a galaxy are related to the type of distribution of the gas velocity dispersion  $\sigma$  across its image. This suggests that the presence of the band of the enhanced gas velocity dispersion can be an indicator of a specific evolution (or a specific stage in the evolution) of a galaxy.

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## Keywords

Galaxies: ISM, Galaxies: kinematics and dynamics

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