

Some improvements of new method of investigation of the alignment of galaxies in clusters

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The problem of large structure formation is one of the most important problems in modern cosmology and extragalactic astronomy. Various scenarios make different predictions concerning orientation of galaxies in structures, distribution of spins of galaxies and alignment between the brightest galaxy and the major axis of the structure. The ultimate test for a given scenario would be to test it against observations. In the project, we will use the methods given by Godłowski & Flin (2010), Godłowski et al. (2010) and Godłowski (2012), although they will be greatly improved, by enriching calculation of the correlation functions in order to provide results comparable with numerical simulations. Moreover, the method was improved in such a way that not only the distribution of position angles for galaxy major axes was analyzed, but the distribution of the two angles describing the spatial orientation of the galaxy plane. We also analyzed consequences of different approximation of “true shape” of galaxies and pointed to possible influence of this problem on the investigation of spatial orientation of galaxies.

The aim of the project is to verify the accuracy of predictions of galaxy formation scenarios. The crucial goal is to discriminate among different models of galaxy formation. For that we use novel theoretical approach (Stephanovich & Godłowski, 2015), in which the distribution function of dynamic characteristics of galaxies ensembles is calculated via tidal (shape- distorting) quadrupolar (and also higher multipolar) interaction between the galaxies. The aim of the project is to verify the accuracy of predictions of galaxy formation scenarios. The crucial goal is to discriminate among different models of galaxy formation. For that we use novel theoretical approach (Stephanovich & Godłowski, 2015), in which the distribution function of dynamic characteristics of galaxies ensembles is calculated via tidal (shape- distorting) quadrupolar (and also higher multipolar) interaction between the galaxies. The implications of the results were discussed with reference to theories of galaxy formation as well.