## Sixteenth Marcel Grossmann Meeting



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## Preliminary results of rich galaxy clusters'spatial distribution analysis on CfA2 Redshift survey data: compact objects or dark matter presence at redshift less 0.022.

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Preliminary results of the investigation of the properties of 13 clusters of galaxies from CfA2 redshift survey are discussed in the presented article. The distributions on absolute magnitude and luminosity represent two areas for clusters ##88, 1101, 1046, 142, 933, 1242, 1652, 107, 150, 316, 317, 961, 977. Redshifts of these clusters are in the region 0.002 –0.022. The distributions on groups members position, absolute magnitude and luminosity represent two areas for these clusters. Galaxies from these areas are paired accordingly its spectral characteristics and position. Also several anomalies of spatial dynamic of galaxies in these clusters were separated. Such structure could be caused by dark matter presence inside cluster in configuration similar to Zeldovich pancake or gravitational lensing on compact object or dark matter blob located between galaxy cluster and observer.

Several peculiarities have found on the spatial distributions of galaxies in clusters ##933, 142, 1046, and 1652. Moreover, these groups reveals associations with high-energy gamma-emission sources on Fermi/LAT 10-Year Point Source Catalog 4FGL DR2 data (4FGLJ1144.9+1937, 4FGLJ0152.2+3714, 4FGLJ1230.8+1223 and 4FGLJ1653.8+3945 correspondingly). These sources are active galaxies 3C 264, B2 0149+37, M87 and MRC 501. Furthermore, 3C 264 and M87 observed in subTeV energy band by VERITAS data. Joint observations of such clusters by orbital gamma-ray observatories with high angular resolution and ground-based Cherenkov air-shower experiments could possibly clarify the type of gravitational lensing and processes of particle acceleration in these objects especially highest energy of emitted gammas. Thus we propose including these and similar clusters in the programs of observations of the planned experiment GAMMA-400 (Gamma Astronomical Multifunctional Modular Apparatus) with angular resolution ~0.01° at  $E\gamma = 100$  GeV and several TeV upper energy band. Also now it is discussed coordination of multiwavelength observations program of Cherenkov Telescope Array (CTA) and GAMMA-400 objects list for observations.

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