[포GC-16] Substructures of Galaxy Cluster Abell 2537

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Abell 2537 has been regarded as one of relaxed galaxy clusters because the X-ray emission is regular and symmetric, while there is also evidence to the contrary that the brightest cluster galaxy (BCG) is offset from the velocity center. To investigate the dynamical state of A2537 we obtain the redshift information of cluster galaxy candidates using Hectospec mounted on the MMT 6.5 m and compile those in the literature. The velocity distribution of member galaxies appears bimodal, with the main peak including the BCG and a secondary peak at velocity difference ~2000 km s-1. Based on the three-dimensional analysis and statistical tests we conclude that A2537 has at least two substructures and is not fully relaxed from a merger near the line-of-sight. We discuss more about the dynamical state of A2537 based on the color-magnitude diagram and X-ray scaling relation.

[포GC-17] On the Origin of the Oosterhoff Dichotomy among Globular Clusters and Dwarf Galaxies

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The presence of multiple populations is now well-established in most globular clusters in the Milky Way. In light of this progress, here we suggest a new model explaining the origin of the Sandage period-shift and the difference in mean period of type ab RR Lyrae variables between the two Oosterhoff groups. In our models, the instability strip in the metal-poor group II clusters, such as M15, is populated by second generation stars (G2) with enhanced helium and CNO abundances, while the RR Lyraes in the relatively metal-rich group I clusters like M3 are mostly produced by first generation stars (G1) without these enhancements. This population shift within the instability strip with metallicity can create the observed period-shift between the two groups, since both helium and CNO abundances play a role in increasing the period of RR Lyrae variables. The presence of more metal-rich clusters having Oosterhoff-intermediate characteristics, such as NGC 1851, as well as of most metal-rich clusters having RR Lyraes with longest periods (group III) can also be reproduced, as more helium-rich third and later generations of stars (G3) penetrate into the instability strip with further increase in metallicity. Therefore, although there are systems where the suggested population shift cannot be a viable explanation, for the most general cases, our models predict that the RR Lyraes are produced mostly by G1, G2, and G3, respectively, for the Oosterhoff groups I, II, and III.