Abstract Submitted
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Study of the Velocity Structure in Abell 154 R. WESLEY TOBIN, ROBERT BERRINGTON, Ball State University — Galaxy clusters are the largest, gravitationally bound structures in the universe. Galaxy cluster growth is believed to occur hierarchically through the merging of two or more nearby, smaller clusters. Actively merging clusters appear as multiple relaxed systems superimposed in position and/or velocity space. Cluster interactions constrain and quantify current knowledge in dark matter and dark energy, which provides a basis for the large-scale structure of the universe. Preliminary results of 147 new radial velocity measurements are presented for Abell 154. The cluster's velocity structure exhibits clearly defined substructure in the form of foreground and background galaxy groups. While these groups correlate by position, they differ significantly in radial velocity, suggesting little or no interaction. The most populous group ($z \approx 0.063$) has a peculiar velocity distribution inconsistent with a dynamically relaxed state. However, the individual subclusters are not easily identifiable from position and radial velocity measurements alone. Statistical tests quantify the significance of substructure within this group and identify the position of any relics of interaction. Observed substructure is confirmed with multi-wavelength data from various sources.

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