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**Long Term Evolution of Magnetized Bubbles in Galaxy Clusters**
WEI LIU, HUI LI, SHENGTAI LI, SCOTT HSU, LANL — We have performed nonlinear ideal magnetohydrodynamic simulations of the long term evolution of a magnetized low-density "bubble" plasma formed by a radio galaxy in a stratified cluster medium. It is found that about 3.5% of the initial magnetic energy remains in the bubble after $\sim 8 \times 10^9$ years, and the initial magnetic bubble expansion is adiabatic. The bubble can survive for at least $8 \times 10^9$ years due to the stabilizing effect of the bubble magnetic field on Rayleigh-Taylor and Kelvin-Holmholtz instabilities, possibly accounting for "ghost cavities" as observed in Perseus-A. A filament structure spanning about 500 kpc is formed along the path of bubble motion. The mean value of the magnetic field inside this structure is $\sim 0.57$ $\mu$G at $\sim 8 \times 10^9$ years. Finally, the initial bubble momentum and rotation have limited influence on the long term evolution of the bubble.

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