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**Limits on Gas Evaporation from Galaxy Clusters**[1] OLGA ZAKUTNYAYA, Space Research Institute, Russia, MIKHAIL MEDVEDEV, Univeristy of Kansas — Resent observations of a number of galaxy clusters using the Sunyaev-Zel'dovich effect indicate that about 1/3 of baryonic mass is missing from the hot intra-cluster medium (ICM), which is significantly larger than the fraction of stars and cool gas, which account for only about 10%. Here we address the question whether the remaining $22 \pm 10\%$ can be accounted for by thermal evaporation of gas from clusters. We have found that evaporation can occur only from the cluster "surface", $r \sim r_{\rm vir}$, and not from it's interior. We evaluated particle diffusion through the magnetized ICM for several scenarios of ICM turbulence and found that diffusivity is suppressed by at least a factor of 100 or more, compared to the Spitzer value. Thus, only particles from radii $r \gtrsim 0.9 r_{\rm vir}$ can evaporate. Diffusion of particles from inside the cluster, $r \lesssim 0.9 r_{\rm vir}$, takes longer than the Hubble time. This lowers the cluster-averaged fraction of the evaporated hot gas to few percent or less. However, if the missing hot component *is indeed* due to evaporation, this strongly constrains the magnetic field structure in the cluster envelope, namely either (i) the gas is completely unmagnetized ($B \leq 10^{-21}$ gauss) in the cluster halo or (ii) the magnetic fields in the ICM are rather homogeneous and non-turbulent.

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