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Title:	The complex intracluster medium of Abell 1569 and its interaction with central radio galaxies
Authors:	Tiwari, Juhi (/jspui/browse?type=author&value=Tiwari%2C+Juhi) Singh, Kulinder Pal (/jspui/browse?type=author&value=Singh%2C+Kulinder+Pal)
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Issue Date:	2021
Publisher:	Oxford Academic
Citation:	Monthly Notices of the Royal Astronomical Society, 509(3), 3321–3338.
Abstract:	We present the first in-depth study of X-ray emission from a nearby ($z \sim 0.0784$) galaxy cluster Abell 1569 using an archival Chandra observation. A1569 consists of two unbound subclusters – a northern subcluster (A1569N) hosting a double-lobed radio galaxy 1233+169 at its centre, and a southern subcluster (A1569S) harbouring a wide-angle-tailed (WAT) radio source 1233+168. X-ray emission from A1569N and A1569S extends to a radius $r \sim 248$ kpc and $r \sim 370$ kpc, respectively, indicating that the two gas clumps are group-scale systems. The two subclusters have low X-ray luminosities (~ 1042 – 43 erg s $^{-1}$), average elemental abundances $\sim 1/4$ Z $_{\odot}$, low average temperatures (~ 2 keV), and lack large ($r \gtrsim 40$ – 50 kpc) cool cores associated with the intracluster gas. We detect a pair of cavities coincident with the radio lobes of 1233+169 in A1569N. The total mechanical power associated with the cavity pair is an order of magnitude larger than the X-ray radiative loss in the cavity-occupied region, providing corroborating evidence for cavity-induced heating of the intragroup gas in A1569N. A1569S exhibits possible evidence for a small-scale cluster-subcluster merger, as indicated by its high central entropy, and the presence of local gas elongation and a density discontinuity in between the bent radio tails of 1233+168. The discontinuity is indicative of a weak merger shock with Mach Number, $M \sim 1.7$. The most plausible geometry for the ongoing interaction is a head-on merger occurring between A1569S and a subcluster falling in from the west along the line bisecting the WAT tails.
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