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Emergent Order in the Kagome Ising Magnet $Dy_3Mg_2Sb_3O_{14}$

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The 3:1 cation ordered pyrochlore $Dy_3Mg_2Sb_3O_{14}$ forms a magnetic lattice of layered two-dimensional (2D) Kagome sheets, comprised of corner sharing triangles. As in the 3D spin-ice analogue, $Dy_2Ti_2O_7$, the Dy^{3+} spins have Ising like behaviour. Here, we show that the layered Ising magnet $Dy_3Mg_2Sb_3O_{14}$ hosts an emergent order predicted theoretically for individual kagome layers of in-plane Ising spins. Neutron-scattering and bulk thermomagnetic measurements, supported by Monte Carlo simulations, reveal a phase transition at $T^* = 0.3$ K from a disordered spin-ice like regime to an "emergent charge ordered" state in which emergent charge degrees of freedom exhibit three-dimensional order while spins remain partially disordered. Our results establish $Dy_3Mg_2Sb_3O_{14}$ as a tuneable system to study interacting emergent charges arising from kagome Ising frustration.