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**Magnetic fluctuations and orbital orderings in ferrimagnetic spinels** JAE-HO CHUNG, NIST Center for Neutron Research and University of Maryland, JUNG HWA KIM, SEUNG-HUN LEE, University of Virginia, TAKU S. SATO, University of Tokyo, TAKURO KATSUFUJI, Waseda University — We report our inelastic neutron scattering studies of two related spinels, $AB_2O_4$ (A = Mn, B = Mn and V), with $e_g$ and $t_{2g}$ orbital degeneracy, respectively. Both systems undergo noncollinear triangular ferrimagnetic orderings at low temperatures, where the lattice symmetries are tetragonal. Characteristics of the phase transitions, however, are different. In the case of $Mn_3O_4$, the tetragonal distortion with $c > a$ exists below T = 1443 K, and upon cooling a noncollinear ferrimagnetic ordering occurs at 42 K, followed by two more magnetic transitions into incommensurate (40 K) and commensurate cell doublings (34 K). Those magnetic phases exhibit magnetocapacitance. In the case of $MnV_2O_4$, on the other hand, a collinear ferrimagnetic ordering occurs at 65 K, followed by the tetragonal distortion with $c < a$ and a noncollinear ordering at 58 K. Our single crystal inelastic neutron scattering data show magnetic excitations up to 20 meV for $Mn_3O_4$ and up to 40 meV for $MnV_2O_4$. We have performed linear spin wave calculations to obtain their effective Hamiltonians by comparing the calculated dispersions of spin waves to the observed ones. The implications of the spin Hamiltonians to their orbital states, and the polarization of spin waves will be discussed.

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