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Abrupt structural transition in V 2 O 3 revealed by pair distribution function analysis ETHAN FLETCHER, BENJAMIN FRANDSEN, Brigham Young University-Provo, KENTARO HIGASHI, HIROSHI KAGEYAMA, Kyoto University — V_2O_3 is a popular system for studying Mott insulators, which are materials that are driven into an insulating state by strong electron correlations. Despite decades of research, a complete understanding of the metal-insulator transition in V_2O_3 has not been conclusively established. Here, we present comprehensive atomic and magnetic pair distribution function (PDF) analyses of V_2O_3 using both x-ray and neutron total scattering measurements, shedding new light on the mechanism of the transition from the point of view of short-range structural and magnetic correlations on both sides of the transition. We observe an abrupt structural transition with no hint of short-range monoclinic distortions above the transition temperature. This lack of structural fluctuations above the transition contrasts with the known presence of magnetic fluctuations in the high-temperature state, suggesting that the lattice degree of freedom plays a secondary role behind the spin degree of freedom in the transition mechanism.

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