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Magnetic Fluctuations in a trapped binary Bose gas RUSSELL BISSET, Los Alamos Natl Lab, RYAN WILSON, United States Naval Academy, CHRISTOPHER TICKNOR, Los Alamos Natl Lab — We demonstrate that measurements of number fluctuations within finite cells provide a direct means to study scaling in a trapped two-component, or binary Bose gas. This system supports a second-order quantum phase transition between miscible (co-spatial) and immiscible states that is driven by a diverging susceptibility to magnetic fluctuations. As the transition is approached from the miscible side, the magnetic susceptibility is found to diverge, but with an exponent that depends strongly on the geometry and orientation of the observation cell. We show that the behavior expected in the homogeneous gas, can be recovered by using an observation cell that covers half of the trapped system. Interestingly, as the transition is approached from the immiscible (symmetry-broken) side, the magnetic susceptibility exhibits a scaling, but with a non-trivial exponent.

Christopher Ticknor
Los Alamos Natl Lab

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