Abstract Submitted
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Trapping Centers at the SuperfluidMott-insulator Criticality: Transition between Charge-quantized States[1] KUN CHEN, YUAN HUANG, University of Massachusetts at Amherst, YOUJIN DENG, University of Science and Technology of China, BORIS SVISTUNOV, University of Massachusetts at Amherst — Under the conditions of superfluid–Mott-insulator criticality in two dimensions, the trapping centers—*i.e.,* local potential wells and bumps—are generically characterized by an integer charge corresponding to the number of trapped particles (if positive) or holes (if negative). Varying the strength of the center leads to a transition between two competing ground states with charges differing by ± 1. The hallmark of the transition scenario is a splitting of the number density distortion, $\delta n(r)$, into a half-integer core and a large halo carrying the complementary charge of $\pm 1/2$. The sign of the halo changes across the transition and the radius of the halo, r_0, diverges on the approach to the critical strength of the center, $V = V_c$, by the law $r_0 \propto |V - V_c|^{-\tilde{\nu}}$, with $\tilde{\nu} \approx 2.33(5)$.

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