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Editors • Netram Kaurav, Kamal Kumar Choudhary, R. C. Dixit and G. D. Gupta

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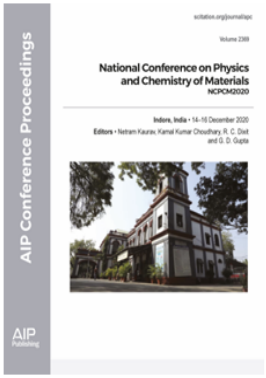

Volume 2369: National Conference on Physics and Chemistry of Materials

National Conference on Physics and Chemistry of Materials

By Netram Kaurav, Kamal Kumar Choudhary, R. C. Dixit, and D. D. Gupta

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These proceedings will be of interest to: Scientists, researchers, PhD students, post-doctoral fellows, condensed matter physicists, materials scientists, and nanotechnologists.

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Melting of Mott phases in spin-1 Bose Hubbard model

Bhargav K. Alavani; Ananya Das; Ramesh V. Pai

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The Cluster Mean Field theory calculation is extended for finite temperatures to study the combined effect of quantum and thermal fluctuations on various phases arising in the spin-1 Bose Hubbard model. This investigation finds that the polar nature of the superfluid phase persists, and the density of bosons with spin component $\sigma = 0$ increases with the temperature. The phase diagram is obtained and compared with that of the single-site mean-field theory. Compressibility shows a signature of divergence at the transition from the polar superfluid phase to the normal bose liquid phase. Small thermal fluctuations are sufficient to destroy the anti-ferromagnetic, maximally entangled odd density Mott insulator phase, whereas large thermal fluctuations are needed to break the singlet formed in the even density Mott insulator phase. However, in both the cases, the insulators melt to normal bose liquid at the same temperature.

Topics