

Abstract Submitted  
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**Raising the Bose-Einstein condensation critical temperature using vacancies** M.A. SOLIS, Instituto de Fisica, Universidad Nacional Autonoma de Mexico, J.G. MARTINEZ, J. GARCIA, Posgrado en Ciencias Fisicas, Universidad Nacional Autonoma de Mexico, M. FORTES, P. SALAS, Instituto de Fisica, Universidad Nacional Autonoma de Mexico, O.A. RODRIGUEZ, Posgrado en Ciencias Fisicas, Universidad Nacional Autonoma de Mexico — We have studied the thermodynamic properties of an Ideal Bose gas confined within a semi-infinite box with periodic permeable multilayers [1], in particular we have calculated its BEC critical temperature and isochoric specific heat, where we have always observed a critical temperature  $T_c$  smaller than the BEC critical temperature ( $T_0$ ) of an infinite homogeneous ideal Bose gas. However, when we introduce a plane vacancy, a finite gap between the ground and first excited states in the particle energy spectrum is introduced, which increases the critical temperature beyond  $T_0$  and generates a specific heat jump at  $T_c$ . We expect that these vacancies could lead to a raise in the critical temperature of superfluids within lattice structures. [1] P. Salas, et al., PRA **82**, 033632(2010); O.A. Rodríguez, et al., J. Low Temp. Phys. **183**, 144 (2016); V.E. Barragan, et al., Int. J. Mod. Phys. B **30**, 1650099 (2016). We acknowledge partial support from grants PAPIIT IN107616 and CONACyT 221030.

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