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Ground State Energy and Momentum Distribution Function for a Bose Gas Within a Multi-Rods Structure O. A. RODRIGUEZ, Posgrado en Ciencias Fisicas, Universidad Nacional Autonoma de Mexico, M. A. SOLIS, Instituto de Fisica, Universidad Nacional Autonoma de Mexico — We use the Variational Monte Carlo (VMC) method to calculate the ground state (gs) energy and the momentum distribution of an interacting Bose gas confined by a one-dimensional periodic multi-rods structure created by an external Kronig-Penney potential. The VMC gs energy is compared with that previously obtained using the Mean-Field theory approximation by solving analytically the Gross-Pitaevskii equation [1]. In the limit of zero external potential, we recover the well-known Lieb-Liniger gas, which for strong interactions becomes the Tonks gas. In this limit case, we compare our variational results with those obtained originally by Lieb and Liniger [2], as well as with those calculated by means of the Diffusion Monte Carlo (DMC) method [3]. Only in the region of high density and weak interaction, Mean-Field results are equal to DMC results and slightly better than the variational ones. [1] O.A. Rodríguez and M.A. Solís, "Ground state of a Lieb-Liniger gas within multi-rods solving analytically the Gross-Pitaevskii equation", work in process. [2] E.H. Lieb and W. Liniger, PR **130**, 1605 (1963). [3] G.E. Astrakharchik and S. Giorgini, PRA **68**, 031602 (2003). We thank partial support from grants CONACyT 221030 and PAPIIT IN107616.

Omar Abel Rodriguez Lpez
Universidad Nacional Autonoma de Mexico

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