Numerical estimate of correlation energy for two electrons confined in 2D quantum dot TAKUMA OKUNISHI, YUKI NEGISHI, MASAKAZU MURAGUCHI, KYOZABURO TAKEDA, Waseda University — Local density approximation (LDA) is now widely accepted to design the novel materials as well as to predict new phenomena. In practical use of LDA, estimate of correlation energy is crucial. Tanatar et al. have given the well-known comprehensive expression of LDA correlation energy for 2D electron gas [1]. However, a straightforward use of this correlation energy to two electrons confined in 2D quantum dot (QD) leads such an inconsistent result that the correlation energy can overcome the Coulomb one because their correlation expression includes only 2D confinement. Specific correlation energy should be requested in accordance with the degree of the QD confinement. So we have obtained the correlation energy for two electrons confined in 2D QD by employing multi-reference configuration interaction (MRCI) technique. Now we are trying to improve the LDA correlation expression by refining their parameters and study time dependent phenomena of electrons in 2D QD by applying the improved LDA. [1] B. Tanatar and D. M. Ceperley, Phys. Rev. B **39**, 5005 (1989).

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